

Revision of *Hibiscus* section *Furcaria* (Malvaceae) in Africa and Asia

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SYNOPSIS. *Hibiscus* section *Furcaria* (Malvaceae) in Africa and Asia is revised. Three new species are described: *Hibiscus parvilobus* F.D. Wilson from Kenya, *Hibiscus reekmansii* F.D. Wilson from eastern Democratic Republic of Congo, Rwanda, Burundi, and western Tanzania, and *Hibiscus sineaculeatus* F.D. Wilson from Nigeria. Four taxa represent new combinations: *Hibiscus goossensii* (Hauman) F.D. Wilson, *Hibiscus partitus* (Hochr.) F.D. Wilson, *Hibiscus gillettii* subsp. *hiernianus* (Exell & Mendonça) F.D. Wilson and *Hibiscus gillettii* subsp. *lundaensis* (Baker f.) F.D. Wilson. *Hibiscus rostellatus* Guill. & Perr. and *Hibiscus persicifolius* Eckl. & Zeyh. are lectotypified.

INTRODUCTION

This treatment of *Hibiscus* section *Furcaria* DC. emend. Hochr. is intended to cover all of the known African taxa. The key also includes the Asian species which I have examined but does not include the two Indian species *H. hoshiarpurensis* T.K. Paul & M.P. Nayar and the (previously undescribed?) species of Bahadur *et al.* (1970) because herbarium material was not available for study.

Hibiscus section *Furcaria* is a natural group of over 100 known species, set apart from species in other sections of the large genus *Hibiscus* by having a calyx with a thickened, rigid midrib and two thickened marginal (or near-marginal) ribs (Wilson, 1994). The sectional name refers to the bifurcate apex of the involuellar bracteoles (epicalyx) of some species. Species are distributed mostly in tropical and subtropical areas of the world but a few penetrate also into the temperate zone (to c. 35°N in North America and 35°S in Australia). Species occur in subsaharan Africa and associated islands, on the Indian subcontinent, southeastern Asia, Australia, islands of the Pacific Basin (including New Zealand), the West Indies, and in North, Central and South America. They occur in a variety of habitats, from grasslands to savannas, forests, and marshes. Some are attuned to a wet-dry precipitation cycle, avoiding the dry cycle by either having an annual habit or going dormant. Others are adapted to a fire climax, in which new shoots arise from a protected crown after a fire. Still others are adapted to a more-or-less uniform rainfall regime; some prefer marshy environments (e.g. *H. diversifolius*). Most are frost-sensitive but at least one species, *H. aculeatus* Walter, is adapted to the warm-cold seasonal cycle of the Gulf and Atlantic coastal plains of the southeastern United States. Growth habits vary from small, herbaceous annuals to subshrubs, shrubs, vines, and trees.

Species have showy, delicate flowers which vary considerably in size; some have potential as ornamentals. Flower colours vary from pure white to various shades of cream, yellow, pink, red, lavender, and purple. Flowers of all species have a red to purple centre (basal petal spot), although mutants have been found which lack this feature. Flowers are adapted to a variety of pollinators; some have rotate, fully opened flowers, others have tubular, pendent flowers. Some have included stigmas and are obviously well adapted for self pollination. Others have exerted stigmas which require cross pollination. The red salverform flower of one Mexican species, *Hibiscus uncinellus* DC., presumably is adapted to hummingbird pollination.

The two most important species of commerce are *Hibiscus cannabinus*, 'kenaf', and *H. sabdariffa*, 'roselle' (Wilson & Menzel, 1964). Kenaf is a rapidly growing, tall annual fibre plant. The bast (bark) fibres are used mainly for cordage, including twine, rope, and burlap. The bast and woody fibres together are used for paper-pulp, and the woody fibres are used for poultry litter, packing materials, and mulch (Taylor, 1992). Other potential uses include animal bedding, an oil and water sorbent, a horticultural medium, an enhancer of bioremediation in breaking down pollutants, construction boards, textile fibres for blending with other fibres, a component of moldable fibre/resin composites, and as mats to protect forest seedlings (Goforth & Fuller, 1994; Werber, 1993). Young kenaf plants afford a nutritious livestock forage (Perry *et al.*, 1993).

Leaves, flowers, and seeds are used for food, the seed oil has various food uses and various parts of the plant are used in folk medicines (Dalziel, 1948; Duke & duCellier, 1993).

The commercial cultivars of roselle fall into one of two categories, edible or fibre. The edible cultivars are small, branched annuals which possess fleshy calyces used for making sauces and drinks and for a number of other food uses. Various parts of the plant are used in folk medicines. The fibre cultivars are tall, unbranched annuals from which the bast fibre is extracted for cordage (Crane, 1949; Dalziel, 1948; Duke & duCellier, 1993). A number of species other than kenaf and roselle are also used as fibre, food or medicines by native peoples. The leaves, particularly when young, have an agreeable acid taste (e.g. *Hibiscus acetosella*) and are used as salad or cooked as spinach (Dalziel, 1948).

MATERIALS AND METHODS

Herbarium specimens and living plants in nature, experimental gardens, and glasshouses formed the basis for this study. The late Margaret Y. Menzel and I, at various times, borrowed herbarium material or solicited assistance from the curators of the following herbaria (Holmgren *et al.*, 1990): ASU, B, BM, BOL, BR, BSD, CAL, EA, FSU, G, K, LISC, LISU, MEL, NA, NBG, P, PAL, PRE, S, SRGH, TCD, TEX. I studied living plants in their native habitats in Kenya and Tanzania (Wilson, 1978) and deposited vouchers of 63 accessions in one or more of the following herbaria: ASU, EA, NA. Plants grown from seeds were studied in experimental gardens and glasshouses at USDA-ARS Research Laboratories at Lake Worth, Palm Beach Co., Florida, and at Phoenix, Maricopa Co., Arizona and also at Florida State University, Tallahassee, Leon Co. Over 60 000 interspecific pollinations were made and more than 140 different interspecific hybrids were produced (Menzel, 1986).

Herbarium specimens examined are listed, insofar as possible, from west to east and from north to south under each taxon. Distribution maps were prepared for all of the African taxa except for those that are mainly cultivated (*Hibiscus acetosella*, *H. radiatus*, *H. sabdariffa*).

GENOME RELATIONSHIPS

The basic chromosome number for the section is $x = 18$. Diploid, tetraploid, hexaploid, octoploid, and decaploid species exist in nature (Menzel & Wilson, 1969; Wilson, 1994). All of the polyploid species studied thus far are allopolyploid. Thirteen genomes have been confirmed or postulated (A, B, C, D, E, G, H, J, P, R, V, X, Y), either through the study of chromosome pairing in interspecific hybrids or through electrophoresis (Menzel, 1986; Wilson, 1994).

The greatest genomic diversity is found in subsaharan Africa; nine of the 13 genomes are represented (A, B, C, D, E, G, H, X, Y) and nine of the 10 confirmed diploid species occur there (all except *Hibiscus costatus* A. Rich. from Mexico, Central America, and the Caribbean). Tetraploid and octoploid species occur also in Africa.

Diploid, tetraploid, and octoploid species occur in India and south-eastern Asia. The eight confirmed diploid species carry genomes designated as follows: 'A' (*H. asper*, *H. cannabinus*, and *H. greenwayi*); 'B' (*H. surattensis*); 'G' (*H. sudanensis*); 'X' (*H. gilletii* subsp. *hiernianus*, *H. mastersianus*); 'Y' (*H. mechowii*). The ninth diploid, *H. berberidifolius*, carries an unknown genome, presumably different from the other African diploid genomes. Analysed African tetraploids carry 'AB' (*H. acetosella*), 'AX' (*H. nigricaulis*), 'AY' (*H. sabdariffa*), and 'GH' (*H. rostellatus*). Analysed or partially analysed African octoploid species carry 'CDE' and a modified 'G' (*H. diversifolius*), or 'BG' and two unidentified genomes (*H. altissimus*). *Hibiscus surattensis*, the African 'B' genome diploid, is found also in India and southeastern Asia. *Hibiscus diversifolius*, the 'CDEG' octoploid, is found in some parts of southeastern Asia. The only two other analysed Indian species are the 'AB' tetraploid *H. radiatus* and the octoploid, *H. hispidissimus*, which carries 'BG' and two unidentified genomes.

The diploid African and Asian species display characteristic morphological patterns based upon the four major diagnostic characters used in the key and correlated with their genome structure. The four major diagnostic characters are as follows: 1) stems aculeate (+) or not aculeate (–); 2) peduncles articulating nearer the summit (+) or nearer the base (–); 3) involucellar bracteoles forked (bifurcate) (+) or simple (–); 4) nectary on the calyx midrib present (+) or absent (–). The patterns are: 'A': (+ – – +); 'B': (+ + + –); 'G': (+ – + –); 'X': (– – + –); 'Y': (+ – – –). In *Hibiscus berberidifolius*, the African diploid with an unknown genome, the most common pattern is the same as that of the 'Y' genome *H. mechowii*, but some plants, having a calyx nectary, show the 'A' pattern.

NATURAL HYBRIDS AND INTROGRESSANT FORMS

I examined a number of sheets which I and/or others interpreted as natural hybrids or introgressant forms. This interpretation is of course subjective, but my extensive experience with experimental hybrids assisted me materially. The most common hybrid or introgressant forms involved the closely related species *Hibiscus asper* and *H. cannabinus* (both 'A' genome diploids), interpreted as follows:

H. asper × *cannabinus*: **Angola**, Welwitsch 5268 (BM); **Democratic Republic of Congo**, Symoens 7321 (BR), Vanderyst 1833 (BR); **Chad**, Fotius 1081 (K), Palayer 421 (P); **Senegal**, Berhaut 4551 (P).

H. asper introgressed with *H. cannabinus*: **Mali**, Chevalier 24919 (P); **Guinea**, Berhaut 4175 (P); **Niger**, Boudet 4980 (P); **Nigeria**, Latilo & Eimuenze FHI 6540 (K).

H. cannabinus introgressed with *H. asper*: **Tanzania**, Schlieben 2218 (BM); **Ethiopia**, Welby s.n. (P).

Other putative hybrids and introgressive types were interpreted as follows:

Hibiscus asper × *molleae*(?): **Democratic Republic of Congo**, DeLoose 203 (BM); **Cameroon**, deWilde & deWilde-Duyfjes 3751 (BR).

H. cannabinus × *nigricaulis*(?): **Mozambique**, Barbosa 1086 (BM, LISC); Garcia 490A (LISC). [NOTE. Barbosa 1086 at BR is *H. nigricaulis*]; [see Gonçalves, L.M. in *Mem. Junta Invest. Ultram.* 2nd ser., 41: 57–159 (1963)].

H. cannabinus × *acetosella*: **Central African Republic**, Chevalier 6914 (G, P); **Angola**, Welwitsch 5269 (BM); **Tanzania**, Wilson & Kissie 7562 (NA); **Uganda**, Jackson 462 (BR).

H. diversifolius × *nigricaulis*(?): **Democratic Republic of Congo**, Hauman 3 (BR).

H. diversifolius × *cannabinus*(?): **Democratic Republic of Congo**, Hulstaert 1472 (BR).

H. sabdariffa × ? : **Democratic Republic of Congo**, Dechamps 13088 (BR).

H. acetosella introgressed with *H. mechowii* or *H. sabdariffa* (?): **Zambia**, Mutimushi 1949 (K).

H. nigricaulis × ? : **South Africa**, Transvaal, Scheepers 327 (PRE).

H. sudanensis × ? : **Democratic Republic of Congo**, Becquet 108 (BM, BR).

THE INDIAN SPECIES OF *HIBISCUS* SECTION *FURCARIA*

Only one of the species which occur in India, *Hibiscus surattensis*, is native to both India and Africa. Two others, *H. cannabinus* and *H. sabdariffa*, are cultigens developed from wild African ancestors. One, *H. mastersianus* (including *H. beddomei*), is native to Africa and apparently adventive in India. *Hibiscus hispidissimus* is native to India and adventive or cultivated in South Africa. *Hibiscus radiatus* may have originated in India as a hybrid between *H. cannabinus* and *H. surattensis* but is now widely cultivated in the Old World and New World tropics (Wilson & Menzel, 1964; Menzel, 1986). *Hibiscus furcatus* Willd. occurs in India and Thailand. *Hibiscus hoshiarpurensis* and the (previously undescribed?) species called *H. furcatus* Roxb. (= *H. hispidissimus* Griff.) by Bahadur *et al.* (1970) are apparently indigenous in India.

Seven of the species which occur in India are included in the key, but *Hibiscus hoshiarpurensis* and the Bahadur *et al.* species are not because herbarium material was unavailable to me. The two introduced cultigens, *H. cannabinus* and the fibre form of *H. sabdariffa*, have aculeate stems, peduncles articulating nearer the base, unforked bracteoles, and calyx nectaries (the 'A' genome pattern). Four native species, *H. surattensis*, *H. hispidissimus*, *H. furcatus*, and *H. radiatus*, have aculeate stems, peduncles articulating nearer the epicalyx, forked bracteoles, and lack calyx nectaries (the 'B' pattern). The adventive *H. mastersianus* (including *H. beddomei*) and the native *H. hoshiarpurensis* have non-aculeate stems, peduncles articulating nearer the base, forked bracteoles, and lack calyx nectaries (the 'X' pattern). Finally, the species of Bahadur *et al.* (1970) has aculeate stems, peduncles articulating nearer the base, forked bracteoles, and lacks calyx nectaries (the 'G' pattern). Furthermore, this species occurs on the Upper Gangetic Plain (Dehra Dun and Tehri-Gharwal), whereas the true *H. hispidissimus* occurs in central and southern India and in Sri Lanka.

TAXONOMIC TREATMENT

Description of *Hibiscus* section *Furcaria*

Hibiscus section *Furcaria* DC., *Prodr.* 1: 449 (1824); emend Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 101 (1900). Lectotype

species: *Hibiscus surattensis* L. (Borssum Waalkes, 1966: 57). Fryxell (1988: 195) noted that Kearney had chosen *H. furcellatus* Desr. as lectotype but that this name was inadmissible.

Hibiscus section *Sabdariffa* DC., *Prodr.* 1: 453 (1824).
Furcaria Kostel., *Allg. Med. Pharm. Fl.* 5: 1856 (1836).
Sabdariffa Kostel., *Allg. Med. Pharm. Fl.* 5: 1856 (1836).
Hibiscus section *Furcaria* subsection *Furcaria simplicia* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 41 (1900), pro parte.
Hibiscus section *Furcaria* subsection *Furcaria typica* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 41 (1900), pro parte.
Hibiscus section *Furcaria* series *Friesia* Ulbr. in Engl., *Pflanzenw. Ost-Afrikas* 3(2): 402 (1921), pro parte.
Hibiscus section *Furcaria* series *Furcaria cannabina* Ulbr. in Engl., *Pflanzenw. Ost-Afrikas* 3(2): 400 (1921), pro parte.
Hibiscus section *Furcaria* series *Furcaria furcellata* Ulbr. in Engl., *Pflanzenw. Ost-Afrikas* 3(2): 400 (1921), pro parte.
Hibiscus section *Furcaria* series *Furcaria diversifolia* Ulbr. in Engl., *Pflanzenw. Ost-Afrikas* 3(2): 402 (1921), pro parte.
Hibiscus section *Furcaria* series *Furcaria sabdariffa* Ulbr. in Engl., *Pflanzenw. Ost-Afrikas* 3(2): 402 (1921), pro parte.
Hibiscus section *Furcaria* series *Saxicolae* Ulbr. in Engl., *Pflanzenw. Ost-Afrikas* 3(2): 403 (1921), pro parte.
Hibiscus [sect.] *Cannabini* Small, *Man. s.e. fl.*: 854 (1933).
Hibiscus [sect.] *Furcellati* Small, *Man. s.e. fl.*: 854 (1933).

Annual herbs, perennial subshrubs, shrubs, trees, or vines. Stems and other plant parts often aculeate. Stems, leaves, peduncles, and floral parts glabrous or variously pubescent. Leaves alternate, the basal leaves usually petiolate, apical ones sometimes sessile and reduced to linear bracts; leaf shape variable, from entire to variously palmately lobed, even on the same plant; often with conspicuous foliar nectaries borne basally on the adaxial surface of the midrib (and sometimes also on secondary ribs). Flowers axillary, solitary, borne in racemes by the reduction or abortion of upper leaves, in clusters at the tips of branches, or in few- to many-flowered sympodia. Peduncles articulated at or near the base, or above the base, often accrescent. Involucellar bracteoles 5–22, free or connate at the base, linear to subulate, simple, channelled, or variously bifurcate at the apex. Calyx gamosepalous, 5-lobed, persistent, leathery or woody in fruit (fleshy in edible forms of *H. sabdariffa*), glabrous or variously pubescent, each lobe with a more or less thickened midrib and two marginal (or near marginal) ribs, the midrib often with a conspicuous nectary. Corolla usually delicate, often large and showy; petals varying in colour from white to various shades of yellow, pink, red, lavender and purple, and usually with a reddish to purple petal spot at the base. Staminal column shorter or longer than the petals, variously coloured. Style exceeding the staminal column, 5-branched above, each branch surmounted by a capitate stigma. Capsule 5-celled, loculicidally dehiscent, glabrous to densely appressed-pubescent (some South American species have glandular hairs on the capsule). Seeds reniform to angular, often scaly or variously marked, but rarely pubescent. Basic chromosome number, $x = 18$.

Key to African and selected Asian taxa of *Hibiscus* section *Furcaria*

- 1 Stems aculeate 2
- Stems not aculeate 28
- 2 Involucellar bracteoles clearly or obscurely bifurcate 3
- Involucellar bracteoles not bifurcate 15

- 3 Calyx nectary absent 4
- Calyx nectary present 14
- 4 Stipules ovate, auriculate, amplexicaul 1. **H. surattensis**
- Stipules linear to subulate, not amplexicaul 5
- 5 Peduncle articulated closer to epicalyx than to base 6
- Peduncle articulated at base, near base, or apparently unjointed 11
- 6 Calyx lobes with reticulate venation and simple to 4-fid bristles on enlarged bases on ribs, otherwise almost glabrous ... 2. **H. altissimus**
- Calyx lobe venation not as above 7
- 7 Lower and mid-plant leaves entire or shallowly lobed 8
- Lower and mid-plant leaves deeply palmately lobed 9
- 8 Leaves with patches of lanate pubescence; stems stellate-pubescent .
..... 3. **H. furcellatoides**
- Leaves without lanate pubescence; stems hirsute with simple hairs to 3 mm long 4. **H. rostellatus**
- 9 Peduncles to 10(–13) cm long in fruit; stems with stout, retrorse aculei on large bases 5. **H. hispidissimus**
- Peduncles ≤5 cm long in fruit; stems more finely aculeate or aculeolate 10
- 10 Peduncles to 5 cm long, articulating 8 mm below epicalyx; ribs of adaxial leaf surface finely and coarsely stellate-pubescent
..... 6. **H. goossensii**
- Peduncles to 2 cm long, articulating ≤5 mm below epicalyx; ribs of adaxial leaf surface with mostly simple (some to 4-fid) hairs
..... 7. **H. furcatus**
- 11 Foliar nectary present 12
- Foliar nectary absent 13
- 12 Mid-plant leaves not lobed; peduncle articulating near base to 1/3 the distance from base to epicalyx 8. **H. sudanensis**
- Mid-plant leaves deeply 3-lobed, midlobe markedly longer than lateral lobes; peduncle articulating at base or appearing unjointed
..... 9. **H. flavo-roseus**
- 13 Stems above glabrate to finely aculeate; leaves glabrate
..... 10. **H. radiatus**
- Stems above with stout retrorse aculei and a line of stellate pubescence; leaves scabrous 11. **H. torrei**
- 14 Involucellar bracteoles clearly bifurcate, outer fork 3–6 mm long, not reflexed, inner fork 1–6 mm long, linear to subulate; peduncles articulating above the base, aculeolate and sparsely puberulent above the joint, densely fine-pubescent below the joint 12. **H. noldeae**
- Involucellar bracteoles obscurely bifurcate, outer fork 2 mm long, reflexed, inner fork vestigial or absent; peduncles articulating at base or appearing unjointed, aculeate and stellate-pubescent throughout
..... 13. **H. nigricaulis**
- 15 Calyx nectary absent 16
- Calyx nectary present 18
- 16 Upper 6–11 mm of involucellar bracteoles lanceolate; leaves throughout the plant deeply palmately 3–5-lobed 14. **H. mechowii**
- Upper part of involucellar bracteoles not lanceolate; leaves entire to shallowly lobed 17
- 17 Peduncle articulating midway between base and epicalyx; leaves densely stellate-pubescent throughout 15. **H. subdiversifolius**
- Peduncle articulating at base or apparently unjointed; leaves with

- simple and stellate hairs on veins, otherwise almost glabrous 16. **H. berberidifolius**
- 18 Stems with large stout aculei 19
Stems more finely aculeate or aculeolate 23
- 19 Aculei borne at the base of stem nodes singly, in pairs, or in threes; leaves to 2 × 4 cm, shed early 17. **H. sparseaculeatus**
Aculei borne ± randomly on the stem; leaves larger, persistent 20
- 20 Calyx densely and finely stellate-pubescent, sparsely aculeate on ribs; midlobes and lateral lobes of lower leaves rotund to spatulate 18. **H. greenwayi**
Calyx with rigid bristles; leaf lobes not rotund or spatulate 21
- 21 Calyx aculeate or aculeolate on the ribs; lobes of lower leaves manifestly secondarily lobed 19. **H. partitus**
Calyx not aculeate or aculeolate on the ribs; leaf lobes not manifestly secondarily lobed 22
- 22 Stems usually with one or more longitudinal lines of pubescence; flowers yellow 20a. **H. diversifolius** subsp. **diversifolius**
Stems more densely and uniformly hairy; flowers reddish to purple 20b. **H. diversifolius** subsp. **rivularis**
- 23 Some flowers subtended by a linear, flattened, sometimes bifid bract resembling the stipules; leaves deeply 5(–7)-lobed, midlobes and lateral lobes of lower leaves often secondarily lobed 21. **H. reekmansii**
Flowers without a subtending bract; leaves variously lobed, but not secondarily lobed 24
- 24 Involucellar bracteoles subulate to triangular, length:base width ratio 3:1 or less, upper 3–6 mm channelled on the inner (ventral) surface 22. **H. sabdariffa**
Involucellar bracteoles generally narrower, length:base width ratio >3:1, inner surface not channelled 25
- 25 Vegetative branches in leaf axils well-developed, with up to 7 persistent leaves; newly opened leaves with a gland-like structure at apex of each leaf margin serration; leaves entire to shallowly 3-lobed 16. **H. berberidifolius**
Vegetative branches not as well-developed; gland-like structure not present; leaves variously lobed 26
- 26 Calyx with white, woolly tomentum basally, or more uniformly distributed; capsule with long, dense appressed pubescence 23. **H. cannabinus**
Calyx without white woolly tomentum; capsule pubescence various 27
- 27 Calyx with bristly simple hairs on ribs, almost glabrous between ribs; capsule with long, dense appressed pubescence 24. **H. parvilobus**
Calyx with antrorse aculei or pigmented short, coarse bristles on enlarged bases; capsule with short, sparse appressed pubescence 25. **H. asper**
- 28 Involucellar bracteoles manifestly to obscurely bifurcate; calyx nectary absent or present 29
Involucellar bracteoles not bifurcate; calyx nectary present 36
- 29 Calyx and foliar nectaries present; leaves glabrate, sometimes red 26. **H. acetosella**
Calyx nectary absent, foliar nectary absent or present; leaves glabrate to pubescent, green 30
- 30 Foliar nectary absent; leaves glabrate 10. **H. radiatus**
Foliar nectary present; leaves pubescent 31
- 31 Inner fork of involucellar bracteoles ± twice as long as outer fork 32
Inner and outer forks of involucellar bracteoles ± of equal length 34
- 32 Calyx lobes acute to slightly acuminate in fruit; length:width ratio of midlobe of mid-plant leaves 1:1 to 3:1 33
Calyx lobes long-acuminate in fruit; length:width ratio of midlobe of mid-plant leaves c. 4:1 27c. **H. gillettii** subsp. **lundaensis**
- 33 Length:width ratio of midlobe c. 2:1 to 3:1; outer fork of involucellar bracteoles 2–4 mm long, inner fork 6–9 mm long 27a. **H. gillettii** subsp. **gillettii**
Length:width ratio of midlobe c. 1:1; outer fork of involucellar bracteoles 1.5–3 mm long, inner fork 4–5 mm long 27b. **H. gillettii** subsp. **hiernianus**
- 34 Stems lanate-pubescent, patchy below, continuous above; lower leaves deeply 3- to 5-lobed (ratio of base to apex: base to sinus c. 5:1) 28. **H. moxicensis**
Stems not lanate-pubescent; lower leaves shallowly to moderately 3- to 5-lobed (ratio of base to apex: base to sinus c. 1.3:1 to 2:1) 35
- 35 Stems finely stellate-pubescent and with coarse stellate hairs; lower leaves moderately 5-lobed (ratio of base to apex: base to sinus c. 2:1), without a foliar nectary 29. **H. cuanzensis**
Stems with stiff, simple to 3-fid or stellate pigmented bristles on enlarged bases; lower leaves shallowly 3-lobed (ratio of base to apex: base to sinus c. 1.3:1), with a foliar nectary 30. **H. mastersianus**
- 36 Calyx fleshy in fruit; involucellar bracteoles broadly subulate to triangular, upper 3–6 mm channelled on the inner (ventral) surface 22. **H. sabdariffa**
Calyx not fleshy in fruit; bracteoles narrower, not channelled 37
- 37 Stipules divided into 2 or 3 filiform or linear segments; involucellar bracteoles filiform to narrowly linear; all leaves linear; foliar nectary absent 31. **H. elongatifolius**
Stipules simple; involucellar bracteoles linear to subulate; at least lower leaves broader or palmately lobed; foliar nectary present 38
- 38 Involucellar bracteoles subulate, c. 2 mm wide at the base, apex pointed; calyx finely stellate-pubescent and with simple to stellate stiff bristles on enlarged red bases 32. **H. sineaculeatus**
Involucellar bracteoles linear, c. 1 mm wide at the base, apex narrowly lanceolate; calyx densely and finely stellate-pubescent, not bristly 33. **H. scotellii**
1. **Hibiscus surattensis** L., *Sp. pl.* 2: 696 (1753). Type: India, Surat, *Herb. Linn.* 875.29 (LINN-holotype).
- Furcaria surattensis* Kostel., *Allg. Med. Pharm. Fl.* 5: 1856 (1836).
Hibiscus surattensis var. *genuinus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 111 (1900), nom. illeg. (Art. 26.2).
Hochreutiner (1900) lists synonymy for *H. surattensis* sens. strict. (var. *genuinus*), which will not be repeated here.
Hibiscus surattensis var. *villosus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 112 (1900).
Hibiscus surattensis var. *villosus* Backer, *Fl. Batavia* 1: 128 (1907), non Hochr. (1900).
Hibiscus surattensis var. *villosus* forma *concolor* Backer, *Fl. Batavia* 1: 129 (1907). Type: Indonesia, Java, Tandjungpriok, *Backer* 32783 (BO-isotype).
Hibiscus furcatus Craib, *Fl. siam.* 1: 157 (1925), non Roxb. (1814), pro parte quoad specim. *Marcan* 1517.
Hibiscus surattensis forma *immaculata* Kurz ex Rakshit & Kundu in *Sci. & Cult.* 27: 194 (1961). Type: Burma, Pegu Yomah, *Kurz* 1248 (CAL-holotype).

Illustrations: Exell & Gonçalves, *Malvaceae* in *Fl. Moçamb.*: 25, fig. 8, 4 (1979); Gibson, *Wild fl. natal.*: pl. 64, fig. 6 (1975); Hochreutiner, *Fl. Madagascar.*, *Malvac.*: 37, fig. X, 1–3 (1955); Paul & Nayar, *Fasc. fl. India* 19: 154, fig. 32 (1988); Pradeep & Sivarajan, *Taxon* 40: 636, figs 7, 8 (1991); Icones Roxburghianae no. 1504 (K); Wight, *Icon. pl. Ind. orient.* 1: pl. 197 (1839).

Annual herb, up to 3 m high, prostrate or climbing on shrubs or trees; stems reddish green, with soft simple hairs to 2 mm long, sparsely to densely retrorse-aculeate, the aculei often red-tipped. *Stipules* up to 15 × 10 mm, ovate, auriculate, amplexicaul. *Leaves*: petioles up to 11 cm long, hairy and aculeate like the stems, the blades up to 10 × 10 cm, shallowly to densely palmately 3–5-lobed, abaxial surface aculeate and with simple hairs on main and secondary veins and sparsely stellate-pubescent on smaller veins, adaxial surface with mostly simple hairs, the base obtuse to subcordate, the margin serrate, the apex acute to acuminate, the nectary absent. *Flowers* axillary, solitary; peduncles up to 8 cm long, articulating c. 10 mm below the epicalyx, sparsely aculeate and hirsute below, and densely hispid above the articulation; involuellar bracteoles 8–9, up to 15 mm long, spreading, with simple hairs on margins, the apex bifurcate, the outer fork up to 5 × 4 mm, spatulate, the inner fork up to 10 mm long, linear, ascending; calyx up to 2.5 cm long, becoming scarious in fruit, the lobes acuminate, aculeate and setose on the ribs, the nectary absent; corolla bright yellow with red-purple centre and a pink stripe along the edge of each petal, the petals up to 6 × 4 cm, obovate, glabrous; staminal column up to 20 mm long, red, the filaments up to 3 mm long, purple; pollen yellow; style branches up to 5 mm long, cream. *Capsules* up to 15 × 12 mm, ovoid to globose, with dense appressed pubescence, the beak inconspicuous; seeds 3 × 2 mm, subreniform, faveolate and with minute pectinate scales. Chromosome number, $n = 18$.

Ruderal and wild, sea level to 1700 m, in cultivated and abandoned farm fields and plantations, waste ground near habitations, and in a wide variety of natural habitats, many in low-lying areas such as river beds and banks, swamps, and other damp situations, but also in savannas, in grassland and bushland, forest clearings and edges, as well as in coastal habitats such as coastal evergreen bushland and sand dunes.

DISTRIBUTION. Fig. 4. Widespread in subsaharan Africa, also in the Indian subcontinent and southeastern Asia, not in Australia, as reported by Masters (1868, 1872) and other subsequent authors. **Guinea-Bissau**, Susana, 1 December 1960, *Raimundo & Guerra* 274 (G-2 sheets); entre Nova Lamego e Canjufá, 29 October 1950, *Esperito Santo* 3545 (BR). **Sierra Leone**, Kenema (Nongova), 25 November 1952, *Deighton* 5888 (K). **Ivory Coast**, banks of Comoé River, opposite Grand Bassam, 15 July 1963, *de Wilde* 468 (BR); réserve de LAMTO, S/P de Tiassalé, 15 December 1987, *Gautier-Beguín* 728 (G-2 sheets). **Ghana**, Atwabo, 1931, *Fishlock* 21 (BR); Kumasi, September 1928, *Vigne* 1381 (BM, K-2 sheets). **Togo**, prope Lomé, 1900/1902, *Warnecke* 243 (BM, BR, K). **Benin**, Ocoja Oué, 11 December 1901, *LeTestu* 188 (BM-2 sheets); Benin Div., Okomu Forest Reserve, 27 February 1948, *Brenan* 9166 (BM, K). **Nigeria**, Western Province, Massambolahun, 3 miles S. of Bolahun, 6 January 1953, *Konneh* 614 (BR); Ibadan, 1935, *Newberry* 131 (K). **Cameroon**, prés Djoum, 21 November 1966, *Letouzey* 8437 (BR); Bipinde, October 1913, *Zenker* 423 (G-2 sheets). **Central African Republic**, 5 km SW of Bambari on the Alindao road, 8 November 1981, *Fay* 1906 (K); Haute-Kotto, 31 October 1922, *LeTestu* 4271 (BM, BR). **Sudan**, Equatorial Prov., Zande Land, 24 November 1937, *Wyld* 332 (BM). **Príncipe**, Esperança, 27 December 1932, *Exell* 678 (BM, BR). **São Tomé**, Piedada, 1 July 1885, *de Wildeman* 411 (BR). **Equatorial Guinea**, Biocoro-Riaba, cerca de Baó Basuala, 12 February 1989, *Fernández Casas* 11511 (K). **Gabon**, Cap Esterias, 24 February 1968, *Halle & Villiers* 5507 (P). **Democratic Republic of Congo**, Leopoldville, 11 June 1915, *Bequaert* 7576 (BR); Yangambi, 22 September 1936, *Louis* 2642 (K); Kisangani, Zone Lubunga, km 4, route Ubundu, 9 January 1982, *Szafranski* 1032 (BR). **Uganda**,

Kipayo, September 1914, *Dümmer* 1059 (BM, BOL); W. Mengo Dist., Bat Valley, Kyadondo, 19 November 1985, *Rwaburindore* 2142 (BR). **Kenya**, K7, Kilifi Creek, 13 August 1975, *Greenway & Kanuri* 15556 (K); Kilifi Dist., Mida, Arabuko-Sokoke Forest Reserve, 15 miles S. of Malindi, 2 December 1961, *Polhill & Paulo* 881 (B, BR). **Burundi**, Bujumbura, 1 June 1967, *Lewalle* 1990 (BR); Bururi Prov., Kigwena, 4 June 1980, *Reekmans* 9253 (BR). **Tanzania**, Western Prov., Kigoma Dist., Lumbye River mouth, 30 July 1959, *Newbould & Jefford* 1158 (K); Tanga region, 21 km W. of Pongwa, Hway A14, 5 August 1975, *Wilson & Kissie* 75128 (ASU, EA, NA); Bezirk Mahenge, Umgebung der Station Mahenge, 30 June 1932, *Schlieben* 2148 (BM, G); Lutamba-See, 40 km W. Lindi, 2 September 1934, *Schlieben* 5219 (BR); Insel Zanzibar, September 1873, *Hildebrandt* 915 (BM). **Angola**, Cujenjo (?), July 1909, *Gossweiler* 4759 (BM); Pungo Adongo, May 1857, *Welwitsch* 5253, 5254 (BM); in palmaris ad R. Cuango, May 1856, *Welwitsch* 4921 (BM). **Zambia**, Luapula Prov., Fort Roseberry Dist., 23 August 1952, *Angua* 301 (BM); Central Province, Iolanda, Kafue, 4 June 1965, *Robinson* 6683 (BR); Victoria Falls, Long Island, April 1918, *Eyles* 1264 (G). **Malawi**, Southern Reg., Mulanje, Chisambo Forest Plantation, 1 August 1979, *Bandan, Salubeni & Masiya* 1538 (BR). **Mozambique**, Cabo Delgado, 53 km de Diaca para Mocimboa de Praia, 14 April 1964, *Torre & Paiva* 11904 (BR); Maringua, Sabi River, 19 June 1950, *Chase* 2560 (BM-2 sheets); Maputo (Lourenço Marques) Dist., Marracuene, 10 April 1946, *Gomes & Sousa* 3417 (K); Delagoa Bay, Inhaca Island, July 1934, *Weintraub* 20321 (BOL). **Comoros**, Grande Comore, N. O. T'Sidje-Moroni, 19 August 1981, *Doutrelepoint* 1085 (BR). **Seychelles**, Mahé . . . road from Victoria to Exile, 18 July 1936, *Day* 73 (BM). **Zimbabwe**, Sebwingwe Dist., confluence of Sanyati and Zambesi Rivers, 1 September 1955, *Davies* 1510 (BR); Umtali Dist., on stream bank beyond Cross Hill, November 1948, *Chase* 1665 (BM-2 sheets). **Madagascar**, Majunga (Mahajanga) Prov., Station forestière d'Ampijoroa, c. 30 km N. d'Andranofasika Forêt, 8 April 1984, *Dorr & Koenders* 2958 (K); Ambovomba, 2 June 1931, *Decary* 8963 (G). **South Africa**, Transvaal, Zoutpanasberg, 4 km NW of Punda Maria, 18 May 1949, *Codd & de Winter* 5552 (PRE); Transvaal, Lekgalameetse Nat. Res.: Cyprus, near last bridge over Wolfspuit, 3 May 1985, *Stalmans* 581 (PRE); Natal, 2.5 km from Arboretum turnoff on old Richardsbay road, 12 December 1985, *Pienaar* 828 (PRE); Natal, Alexandra Dist., Dumisa Station, Friedenau Farm, 26 March 1908, *Rudatis* 333 (G). **Swaziland**, Pigg's Peak Dist., Wyldesdale, 25 March 1959, *Compton* 28741 (NBG); Mankaiiana Dist., Ntondozi, 27 June 1963, *Compton* 31650 (NBG). **India**, Kerala, Trichur Dist., Chiklai, 29 September 1982, *Ramamurthy* (Bot. Surv. Ind. 74953) (CAL); Tamil Nadu, Kanniyakumari Dist., Kughithurai, 10 December 1980, *Swaminathan* (Bot. Surv. Ind. 70302) (CAL); Assam, Garo Hills, Rewar, 16 November 1930, *Parry* 891 (K). **Bangladesh**, Chittagong, 3 January 1851(?), *Hooker & Thompson* 353 (K). **China**, Hainan, K'iung-shan Dist., Kiung-chow City and vicinity, 30 July 1932, *Fung* 20256 (B, BM, K); ins. Hong Kong, Hoihan, 1877, *Bullock* 559 (BM). **Sri Lanka**, without specific locality or date, *Fraser* 68 (BM, BR). **Thailand**, Pak Chong, 29 December 1923, *Marcant* 1517 (BM); Phitsanulok Prov., Thung Saleng Louang, 25 November 1965, *Vidal* 4559 (P). **Laos**, Vientiane Prov., env. de Ban Na Hai, 22 October 1965, *Vidal* 4121 (P). **Vietnam**, Tonkin, bords de la route conduisant de Tu-Phap aux roches de Notre-Dame, 20 December 1887, *Balansa* 3715 (P); Onnam, Courane, 18 February 1939, *Poillane* 28900 (P). **Philippines**, Luzon, Union Prov., Bauang, February 1904, *Elmer* 5666 (G); Culio Island, December 1927, *Ramos & Edamo* s.n. (BR); Occidental Mindoro Prov., Abra de Ilog, January 1951, *Sulit* s.n. (BR). **Singapore**, 1893, *Ridley* s.n. (BM). **Malaysia**, c. mile 1.2 from Kota Belud to Kabaiau, 11 March 1954, *Darnton* 509 (BM). **Indonesia**, Sumatra, Hoeta Pradang, Asahan, east coast, October–December 1932, *Krukoff* 4401 (BR); Java, sables maritimes, Batavia, 13–15 August 1878, *Savinierre* 1170 (BR); Moluccas, Ambon (Island of Amboyna), 3–15 September 1840, *Barclay* 4136 (BM); Timor, without date, *Forbes* 3817 (BM).

Hibiscus surattensis forma *immaculata* Kurz ex Rakshit & Kundu is a later name for *H. surattensis* var. *villosus* forma *concolor* Backer, a form with completely yellow flowers, lacking the basal petal spot. Hochreutiner (1900: 112–113) mistakenly lists synonyms for *H. surattensis* sens. lat., which apply to other taxa included in this paper (see *H. furcatus* Willd., *H. hispidissimus* Griff., *H. acetosella* Welw. ex Hiern, *H. mastersianus* Hiern, and *H. rostellatus* Guill. & Perr.).

Pradeep & Sivarajan (1991: 635) point out that several authors (Borssum Waalkes (1966), among them), wrongly listed *Narinam poulli* Rheede as a synonym of *H. surattensis*, while in fact it is synonymous with *H. hispidissimus* Griff.

I examined a number of variant forms of *Hibiscus surattensis*. The most common is one that has narrow stipules and involucellar bracteoles, occurring throughout much of the range of this species. It may be interpreted as a mutant or as an introgressant form. Examples are: **Liberia**, *Adam* 16511 (BM), 20527, 20702 (K); **Tanzania**, *Renvoize* 2010 (K); **Mozambique**, *Goodier* 1005 (BM); **India**, *Hamilton* s.n. (BM); **Thailand**, *Hosseus* 468 (BM); **Madagascar**, *Herb. Martii* 68 (*F.V. Thompson* s.n.) (BR); **Laos**, *Vidal* 4121 (P); **Vietnam**, *Pierre* s.n. (P). Other variant forms seen are as follows: narrow, acuminate calyx lobes, **China**, Hainan, *Henry* s.n. (G); an apparently purple-flowered form, **Madagascar**, *Hildebrandt* 2869 (G); atypical leaves, narrow stipules [possibly *H. surattensis* × *H. rostellatus* hybrid], 'French West Africa', *Roberty* 6401, 15860 (G); villous calyx, **Cameroon**, *Zenker* 423 (G), **Tanzania**, *Schlieben* 3690 (G); miniature but typical-shaped stipules, **Thailand**, *Marcant* 1517 (BM).

2. *Hibiscus altissimus* Hornby in *Proc. & Trans. Rhodesia Sci. Assoc.* **41**: 55 (1946). Type: Mozambique, Lusa River Valley, W. of Guruè, 7 May 1942, *Hornby* 4563 (K!-isotype).

Fig. 1D.

A woody *scrambler* over bushes; stems to 10 m long, retrorse-aculeate, otherwise almost glabrous or with a line of pubescence, or sometimes more densely pubescent above. *Stipules* 5–9 mm long, linear, almost glabrous. *Leaves*: petioles 0.2–10 cm long, retrorse-aculeolate plus a line of pubescence adaxially, the blades 3–11 × 2–13 cm, broadly lanceolate to ovate to 3(incipiently 5)-lobed, the midlobe broadly lanceolate to ovate, the lateral lobes lanceolate to triangular, sometimes unequal in length, the blades abaxially retrorse-aculeolate on the ribs and with sparse coarse 2-fid to stellate hairs on the veins, adaxially with simple to stellate sparse hairs on veins, the base cuneate, truncate, or cordate, the margin serrate or dentate, the apex acute, the nectary 1–4 mm long, slit-like. *Flowers* axillary, solitary or clustered near the ends of branches; peduncles 1–5 cm long in fruit, articulating 1–3 mm below the epicalyx, or sometimes the joint not evident, accrescent, retrorse-aculeolate and densely and finely stellate-pubescent; involucellar bracteoles 10–12, 9–12 mm long, linear below the apex, with coarse, mainly simple bristles on enlarged bases on the margins, the apex bifurcate, the outer fork 3 mm long, lanceolate, the inner fork 5–9 mm long, linear, ascending, the base free; calyx 2–3 cm long in fruit, the lobes lanceolate, acute to acuminate, with reticulate venation and simple to 4-fid bristles on enlarged bases on the ribs, otherwise almost glabrous or sparse, finely stellate-pubescent, the nectary absent; corolla yellow with a purple centre, the petals 3.5–5 × 2–3 cm, obovate, sparsely and finely stellate-pubescent dorsally, almost glabrous ventrally; staminal column 22–25 mm long, the filaments 1 mm long; style branches 4–5 mm long. *Capsules* 17–27 × 14–21 mm, densely appressed-pubescent, the beak 2 mm long, glabrous; seeds (according to Exell, 1961) 4 × 3 mm, subreniform, with whitish, irregularly discoid scales. Chromosome number, $n = 72$.

Undergrowth in forest glades and plantations and in seral montane scrub.

DISTRIBUTION. Fig. 5. Southeastern Africa. **Mozambique**, Manica e Sofala, Cheringoma, Durundi, 17 May 1948, *Barbosa* 1660 (BM); Cheringoma, Inhamaing, 24 May 1948, *Mendonça* 4363 (BM); Sul do Save, entre Bilene e Vila de João Belo, 1 May 1957, *de Carvalho* 131 (BM); Bilene, Praia de S. Martinho do Bilene, 14 May 1957, *de Carvalho* 213 (BM); Laurenço

Marques, Rikatla, April 1918, *Junod* 238 (BM, G). **South Africa**, Transvaal, 20 km along Witvlag Road from Louis Trichardt, 4 April 1971, *Oakes* 1585 (PRE); Louis Trichardt, Entabeni, 16 August 1989, *van Heerden* A33 (PRE); Letaba, Duiwelskloof Rosendal, 26 July 1958, *Scheepers* 438 (G); Natal, Hlabisa, Dukuduku forest glade, 29 January 1967, *Strey* 7365 (PRE).

Exell (1961) cites, as a synonym of *Hibiscus altissimus*, *H. furcatus* 'sensu Harv.' in Harv. & Sond., *Fl. Cap.* **1**: 176 (1860), but Harvey's succinct description and his reference to Drège's specimens labelled '*Hibiscus hamatus* E. Mey.' cast some doubt on this conclusion. I examined two of Drège's specimens, collected at Port Natal and labelled *H. hamatus* (Drège s.n., G; Drège 5289, P); both are referable to the native Indian species that has long been called *H. furcatus* Roxb. (= *H. hispidissimus* Griff.). These plants were possibly adventive or cultivated in Natal.

3. *Hibiscus furcellatoides* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* **20**: 157–158 (1917). Type: Guinea, entre le Konkouré et Timbo, March 1905, *Chevalier* 12504 (P!-holotype).

Fig. 1A.

Hibiscus furcatus Hutch. & Dalziel, *Fl. W. trop. Afr.* **1**(2), 1st ed.: 267 (1928), non Roxb. (1814), pro parte quoad specim. *Chevalier* 12504.

Hibiscus rostellatus Keay, *Fl. W. trop. Afr.* **1**(2), 2nd ed.: 346 (1958), non Guill. & Perr. (1831), pro parte quoad specim. *Chevalier* 12504.

Habit unknown; stems with stout retrorse aculei on large bases, sparsely stellate-pubescent below, densely and finely stellate-pubescent above. *Stipules* 7 mm long, subulate, almost glabrous. *Leaves*: petioles 1.2–2.5 cm long, aculeolate and densely stellate-pubescent, the blades 4.5–6.5 × 4–6 cm, ovate-triangular, the blades of middle leaves and upper leaves entire (lower leaves not seen), abaxially and adaxially with lanate patches, otherwise finely stellate-pubescent, the base truncate, the margin finely serrate, the apex slightly acuminate, the nectary to 6 mm long, prominent, slit-like. *Flowers* axillary, solitary; peduncles 2–3.3 cm long in fruit, articulating 4–9 mm below the epicalyx, with a fine dense stellate tomentum, not aculeate; involucellar bracteoles 9–10, 7 mm long below the apex, linear, flattened, densely and finely stellate-pubescent, the apex bifurcate, the outer fork 3–5 mm long, lanceolate to sagittate, the inner fork 7–8 mm long, linear, ascending, the base free; calyx 1.3–1.8 cm long, the lobes up to 1 cm wide, ovate, acuminate, densely and finely stellate-pubescent, not aculeate, the nectary absent; corolla yellow(?) with a purple(?) centre, the petals up to 4.5 × 3.5 cm, obovate, sparsely stellate dorsally, glabrous ventrally; staminal column 20 mm long, purple near the summit, the filaments 1.5 mm long, anthers brown(?); style branches 5 mm long. *Capsules* 17 × 15 mm, densely appressed-pubescent, the beak 1.5 mm long, glabrous; seeds unknown.

DISTRIBUTION. Fig. 5. Guinea. Known to me only from the type collection.

Bahadur *et al.* (1970) wrongly placed *Hibiscus furcellatoides* in synonymy with the (previously undescribed?) Indian species which they called *H. furcatus* Roxb.

4. *Hibiscus rostellatus* Guill. & Perr. in Guill., Perr. & A. Rich., *Fl. Seneg. tent.* **1**: 55–56 (1831). Type: Apparently not designated. I examined three of Perottet's specimens, one each from BM, G, and P. I designate the specimen from P as the lectotype because it is the most complete and well preserved of the three specimens. The label on the sheet from P reads as follows: 'Herbarium Richard [red ink] *Hibiscus rostellatus* Nob. afigurer [black ink]

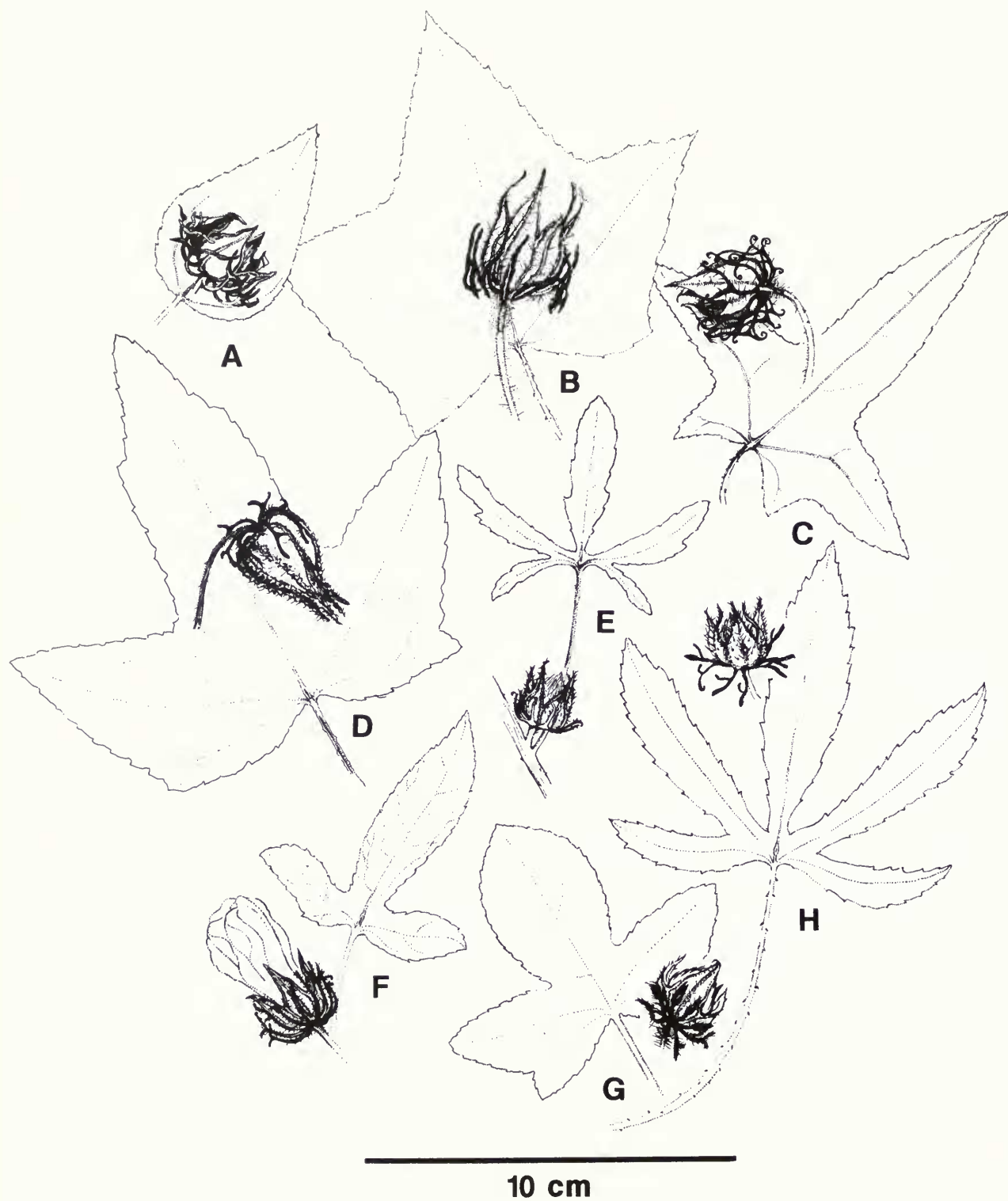


Fig. 1 Leaves and fruits (or flowers) of species of *Hibiscus* section *Furcaria*. **A:** *H. furcellatoides*, Chevalier 12504 (P); **B:** *H. rostellatus*, leaf: Exell & Mendonça 3171 (BM), fruit: Scott Elliot 7244 (BM); **C:** *H. goossensii*, Goossens 1202 (BR); **D:** *H. altissimus*, Mendonça 4363 (BM); **E:** *H. nigricalis*, Exell & Mendonça 1759 (BM); **F:** *H. flavo-roseus*, Young 646 (BM); **G:** *H. torrei*, Torre 435 (BM); **H:** *H. noldeae*, Leeuwenberg 10288 (BR).

Senegal, *Perotter* [red ink]. The sheet from BM has two labels, as follows: 1) '*Hibiscus rostellatus* Nob., n. 88 [in pencil], ...du Cap Vert, Kounoun 13 Mars 1829, *Perotter*'; 2) '*Perotter*, no. 53, 'B' [in pencil] Senegal'. The label on the sheet from G reads as follows: '*Hibiscus rostellatus*, fl. Seneg., Kounoun (Capvert), *M. Perotter* 1831'. The black ink entries on the BM and P sheets were made in the same hand, presumably Perotter's (especially since they say 'Nob.'), while the writing on the G label was in a different hand.

Fig. 1B.

Hibiscus surattensis var. *rostellatus* (Guill. & Perr.) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 110 (1900).

Hibiscus furcatus Hutch. & Dalziel, *Fl. W. Trop. Afr.* 1(2): 267 (1928), non Roxb. (1814), excl. *Chevalier* 12504 (see Keay, 1958: 346).

Hibiscus furcatus Berhaut, *Fl. Seneg.*: 159 (1954), non Roxb. (1814).

Coarse prostrate or climbing perennial, much-branched vine up to 3 m tall; stems more or less hirsute (hairs to 3 mm long) [Zenker 4957 almost glabrous], with many conspicuous retrorse aculei on red bases. *Stipules* up to 11 mm long, filiform to subulate, with fine hairs on margins. *Leaves*: petioles 0.5–9 cm long, with pubescence like that of the stems, the blades 3–13 × 3–15 cm, cordate to very shallowly 3–5-lobed, suborbicular in outline, the lobes triangular, abaxially densely stellate-pubescent and retrorse-aculeolate and with coarse, 2-several-fid bristles on ribs, adaxially sometimes aculeolate on the ribs, usually less densely stellate-pubescent, the base truncate to shallowly or deeply cordate, the margin finely serrate to dentate, the apex acute to long-acuminate, the nectary to 4 mm long, slit-like, on the midrib and sometimes also on two lateral ribs. *Flowers* axillary, solitary, or sometimes clustered on short flowering branches to 8 cm long, or near the plant apex; peduncles 2–8 cm long, articulating 5–10 mm below the epicalyx, with long simple hairs and retrorse aculeoli below the articulation, dense long straight bristles above the articulation; involucellar bracteoles 8–12, 6 mm long below the apex, linear, bristly, the apex bifurcate, the outer fork 3–7 mm long, foliaceous, more or less enlarged, oval or elliptic, sometimes flattened or reflexed, the inner fork 4–10 mm long, subfiliform to subulate-acuminate, the base free; calyx 1.5–3.5 cm long, the lobes ovate-lanceolate, acute to long-acuminate, very finely stellate-tomentose and also with 2-fid to stellate bristles on the ribs, the nectary absent; corolla lemon yellow with a large red-purple centre, the petals 5–7.5 × 3–6.5 cm, showy, obovate, finely stellate-pubescent dorsally, glabrous ventrally; staminal column 22–30 mm long, white to dark pink, the filaments 2 mm long, light to dark pink, the anthers yellow or pink, the pollen orange; style branches 4–8 mm long, light to dark pink; stigmas pink to red-purple. *Capsules* 22–30 × 15–20 mm, ovoid, appressed-pubescent, the beak 2 mm long, glabrous; seeds 5 × 3 mm, subreniform, brown, with parallel striations and fine pectinate scales, the funiculus small, dark brown, glabrous. Chromosome number, $n = 36$.

Ruderal and wild, in farm clearings, plantations, fallow land, savannas, creek and river banks, temporary ponds, swamps, secondary scrub, gallery and rain forests; apparently never cultivated, but leaves are sometimes eaten [e.g. Democratic Republic of Congo, *Staner* 1482 (BR)].

DISTRIBUTION. Fig. 4. Western to eastern central Africa from Senegal to Sudan, Angola, Zambia, and Tanzania. **Senegal**, Laugalkaur, October 1950, *Berhaut* 678 (BR); Bidahay, 25 January 1931, *Trochain* 1307 (P). **Sierra Leone**, Savane Piedmont, est Loma, 16 November 1965, *Jaeger* 8150 (G); Kambia, Scaries, 30 December (year?), *Scott Elliott* 4349 (BM). **Guinea**, Kindua (Kindia?), March 1905, *Chevalier* 13031 (P); Koba, 15 November 1956, *Jacques-Felix* 7262 (P). **Liberia**, Cape Mount, 18 November 1908,

Dinklage 2257 (B); Peàtah, 16 October 1926, *Linder* 1098 (K). **Mali**, Sikasso-Koutiala, 30 December 1950, *Roberty* 13337 (G); **Ivory Coast**, entre Fuènoula et Bouaflé, 28 December 1963, *AkéAssi* 7292 (G); Bingerville, 17–20 February 1907, *Chevalier* 17355 (P); near Tiassalé, right bank of Bandama R., 10 December 1958, *Leeuwenberg* 2150 (BR). **Ghana**, road to Amedzofe, 31 January 1971, *Ents* GC42474 (K). **Benin**, Cercle de Zagnanado, Pays de Hollis, Entre Abbo et Massé, 6 February 1910, *Chevalier* 22969 (P). **Nigeria**, Bende road, 4.5 miles from Umuahia, 9 November 1966, *Ariwaodo* 1436 (K); Western State, Egbado Dist., Alasinde, 14 November 1973, *Eimunjze & Ekwuno* FHI 67996 (K); North East State, Gombe Dist., Malam Sidi, 30 November 1971, *Latilo* FHI 646447 (K); Ilorin Prov., Omu-Aran Dist., on Ilorin-Kabba motor road, 16 November 1968, *Latilo* FHI 62279 (K); Ibadan Div., near Ibadan, 5 January 1950, *Meikle* 959 (BR); southern Nigeria, Eket Dist., main road from Aron to Eket, January 1913, *Talbot* s.n. (BM). **Cameroon**, 10 km S. of Ngaoundéré, Station Fourrière de Wakwa, 1 November 1966, *Leeuwenberg* 7672 (BR); Bipinde, Urwaldgebiet, 1896, *Zenker* 1303 (G-2 sheets); same locality, 1913, *Zenker* 4957 (B, BM). **Chad**, Forêt galerie du Bakoua, 1 November 1968, *Gaston* 2481 (P). **Central African Republic**, 4 km SE of Bambari on the Alindao road, 27 January 1982, *Fay* 2138 (K); right bank of Mambéré R., 2 km S. of Carnot, 6 December 1965, *Leeuwenberg* 7230 (K); La Haute-Kotto, Oubangui-Chari, 5 October 1921, *LeTestu* 3325 (BR); **Sudan**, Mongalla Prov., Valley of R. Yei near source, 28 February 1934, *Dandy* 543 (BM); Equatorial Prov., Kagelu Stat., Yei, 2 October 1937, *Myers* 7824 (K). **Congo**, Impfondo, 24 September 1966, *Bouguet* 2049 (P). **Democratic Republic of Congo**, Leopoldville Prov., Thysville Terr., 22 April 1960, *Compere* 1979 (K); Parc Nat. de l'Upemba, June 1949, *deWitte* 6692 (BR, K); Eala, November 1930, *Staner* 1482 (BM); Lac Kivu, Ile Wahu, 15 March 1953, *Vander Ben* 208 (BR). **Uganda**, Kyagwe, Mukono U4, 1 km E. of Lugazi town, 25 September 1987, *Rwaburindore* 2546 (BR); without locality (Ruwendzori Expedition 1893–94), *Scott Elliot* 7244 (BM); Albert-Edward-Nyanza, 1893–94, *Scott Elliot* 8046 (BM). **Rwanda**, Kirambo, 6 June 1981, *Troupin* 16280 (BR). **Angola**, Cuanza Sul, between Gabela and Vil Nova de Seles, R. Cuvo, 12 July 1937, *Exell & Mendonça* 3171 (BM-2 sheets); Pungo Adongo, without date, *Welwitsch* 5243 (BM). **Zambia**, Solwezi, 14 May 1969, *Mutumushi* 3309 (K). **Tanzania**, Msimbazi stream, 82 km WSW Dar Es Salaam, 7 May 1972, *Wingfield* 1967 (EA); Mahali Mts, Kasoge, 21 November 1973, *Uehara* 192 (EA).

Bahadur et al. (1970) wrongly placed *Hibiscus rostellatus* in synonymy with the (previously undescribed?) Indian species which they called *H. furcatus* Roxb.

Variant forms of *Hibiscus rostellatus* were examined, as follows: short bracteole forks and leaves that resemble those of *H. goossensii*: **Tanzania**, *Faulkner* 3667 (BR); fine, short pilose indumentum: **Congo**, *Descoings* 5880 (P); reduced pubescence on plant parts: **Cameroon**, *Letouzey* 9518 (P).

5. *Hibiscus hispidissimus* Griff., *Not. pl. asiat.* 4: 521 (1854); Pradeep & Sivarajan in *Taxon* 40: 634–637 (1991). Type: India, Kerala, Thanneerpandal, near town of Badagara, *Pradeep* 5008 (K-neotype, Pradeep & Sivarajan, 1991; CALI-isoneotype).

Narinam poulli Rheede, *Hort. malab.* 6: 75, t. 44 (1686) (see Pradeep & Sivarajan, 1991: 635).

Hibiscus furcatus Roxb. [*Hort. beng.* 51 (1814), nom. nud., nom. illeg. (Art. 53.1)] ex DC., *Prodr.* 1: 448 (1824), non Willd. (1809) nec Moritz (1846) nec Mast. (1868) nec Bahadur, Dayal & Raturi (1970). Type: Icones Roxburghianae no. 1582 (K!-holotype).

Hibiscus aculeatus Roxb., *Fl. ind.* 3rd ed.: 206 (1832), non Walter (1788) nec Bahadur, Dayal & Raturi (1970), nom. illeg. (Art. 53.1). Type: Icones Roxburghianae no. 356 (K!-holotype).

Furcaria roxburghii Kostel. in *Allg. Med. Pharm. Fl.* 5: 1856 (1836). *Hibiscus aculeatus* T.K. Paul & M.P. Nayar, *Bull. Bot. Surv. India* 22: 195 (1980), non Walter (1788) nec Roxb. (1832).

Illustration: Pradeep & Sivarajan, *Taxon* 40: 636, figs 1–6 (1991).

A trailing or rambling shrub to 2 m tall; stems green tinged with

pink, with stout retrorse aculei on enlarged bases, otherwise variously hairy from almost glabrous to densely tomentose. *Stipules* 4–11(–15) mm long, linear to foliate, minutely ciliate to tomentose. *Leaves*: petioles 0.6–10 cm long, aculeate and pubescent like the stems, the blades 3–12 × 2.5–16 cm, blades on lower leaves deeply palmately 3–5(–7)-lobed, the midlobe lanceolate to ovate, the lateral lobes ovate to triangular, the outer lobes triangular, the blades on upper leaves lanceolate, entire or moderately 3-lobed, blades of all leaves abaxially retrorse-aculeolate on the ribs, simple to stellate-pubescent on the ribs and veins, adaxially sparsely pubescent, with mostly simple hairs on ribs and veins, or tomentose, the base truncate to shallowly cordate, the margin crenate to coarsely serrate, the apex acute to acuminate, the nectary 1–2 mm long, slit-like, on the midrib and sometimes also on two lateral ribs. *Flowers* axillary, solitary and sometimes clustered on the ends of flowering branches; peduncles 2–10(–13) cm long, articulating 5–14 mm below the epicalyx, below the articulation with retrorse aculeoli and sparse to very dense simple hairs, above the articulation with straight simple pigmented bristles, simple to stellate hairs, and sometimes with some retrorse aculeoli; involucellar bracteoles 8–12, 5–9 mm long below the apex, linear, with fine hairs or tomentose and with straight, coarse pigmented bristles, the apex bifurcate, the outer fork 2–4 mm long, lanceolate to ovate, sometimes reflexed, the inner fork 6–12 mm long, linear to subulate, ascending, the base free; calyx 1.4–2.2 cm long, the lobes triangular to lanceolate, acute to acuminate, almost glabrous or finely stellate-pubescent to stellate-tomentose and with coarse, mostly simple bristles on bases to 4 mm long on ribs, the nectary absent; corolla yellow with a purple centre, the petals 4–6.5 × 3–4.5 cm, obovate, glabrous; staminal column 18 mm long, dark pink, the filaments 2 mm long, the anthers dark pink, the pollen yellow to violet; style branches 6–12 mm long, the styles and stigmata red-purple. *Capsules* up to 15–20 × 15–17 mm, ovoid, densely appressed-pubescent, the beak 2–4 mm long, glabrous; seeds 4 × 3 mm, subreniform, dark brown, foveolate and with parallel striations and minute pectinate scales, the funiculus light tan, glabrous. Chromosome number, $n = 72$.

In scrub and evergreen or semi-evergreen forest, often among rocks.

DISTRIBUTION. Central and southern India and Sri Lanka; possibly adventive in South Africa. **India**, Bombay Presidency, southern Marathra Country and North Canara, 23 March 1881, *Young* s.n. (BM); Goa, Colem, 9 May 1963, *Kanodia* 88497 (BM); Karnataka, Coorge Dist., Mercara Hill Tops, 30 January 1976, *Bannerjee* 11542 (CAL); Coorg Region, c. 50 miles from coast, 3 December 1979, *Pickett* (ASU); Karnataka, 19 km W. of Saklespur, 19 December 1977, *van der Maesen* 3037 (CAL); Canara, Mangalore, 1854, *Metz* 1634 (P); Madras, 1885, *Beddome* 565, 566, 567, 568 (BM); Kerala, Idukki Dist., near Meenmutti, 18 February 1982, *Raju* 71251 (CAL); Madras, Coimbatore, Vellingiri Hills, 18 February 1937, *Sebastine* 2377 (CAL); Madras, Nilgiri Dist., near Woodbriar Estate, 18 November 1958, *Sebastine* 7396 (CAL); Tamil Nadu, Kanyakumari Dist., 23 January 1978, *Henry* 53232 (CAL); **Sri Lanka**, Summo Wadinagala monte, 2 November 1975, *Bernardi* 15617 (G-2 sheets); Sri Lanka, without specific locality, 1863, *Thwaites* 727 (BM, P).

6. *Hibiscus goossensii* (Hauman) F.D. Wilson, comb. & stat. nov.
Type: Democratic Republic of Congo (Zaire), Dist. du Bas-Congo: without specific locality, 1920, *Goossens* 1202 (BR!-holotype).

Fig. 1C.

Hibiscus rostellatus var. *goossensii* Hauman in *Bull. Jard. Bot. État.* **31**: 88 (1961).

Shrub; stems retrorse-aculeolate, glabrous below, very sparsely hairy above. *Stipules* 5 mm long, linear, with simple long (≥ 1 mm)

hairs on margins. *Leaves*: petioles 2–7 cm long, retrorse-aculeolate plus a line of pubescence on the adaxial surface, the blades 4–10 × 4–10 cm, hastately 3-lobed or deeply palmately 5-lobed, the midlobe and lateral lobes lanceolate to narrowly lanceolate, the outer lobes triangular, the sinuses obtuse, the blades abaxially retrorse-aculeolate and finely stellate-pubescent on ribs, sparsely stellate-pubescent on veins, adaxially finely and coarsely stellate-pubescent on ribs, with simple to stellate pubescence on veins, the base truncate to cordate, the margin serrate, the apex acute to acuminate, the nectary 2 mm long, slit-like. *Flowers* axillary, solitary; peduncles 3–5 cm long in fruit, articulating c. 8 mm below the epicalyx, retrorse-aculeolate and finely and sparsely pubescent below the articulation, more densely and finely pubescent and with bristles to 2 mm long above the articulation; involucellar bracteoles 10, 8–10 mm long below the apex, linear, with fine bristles on margins, the apex bifurcate, the outer fork 3–4 mm long, lanceolate, reflexed, the inner fork 8–10 mm long, linear, ascending, the base free; calyx 2.2 cm long in fruit, the lobes broadly lanceolate, slightly acuminate, the ribs not conspicuous, with very fine stellate hairs plus a few simple to 3-fid bristles, the nectary absent; corolla yellow with a purple centre, the petals 3.5 × 2.5 cm, obovate, sparsely stellate-pubescent dorsally, glabrous ventrally. *Capsules* 15 × 14 mm, densely appressed-pubescent; seeds unknown.

DISTRIBUTION. Fig. 5. Democratic Republic of Congo. Known to me only from the type collection.

7. *Hibiscus furcatus* Willd., Enum. pl.: 736 (1809). Type: Southern India(?), (B-W no. 12880-holotype; ASU!-photograph).

Hibiscus surattensis var. *furcatus* (Willd.) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* **4**: 112 (1900).

Hibiscus furcatus Craib, *Fl. siam. enum.* **1**: 157 (1925), non Roxb. (1814), pro parte quoad specims. *Kerr* 2768, *Marcan* 1078.

Herb or shrub to 1.5 m tall; stems with retrorse aculei plus sparse, simple to stellate pubescence below, more dense above. *Stipules* 7–10 mm long, linear to foliate, with fine hairs on margins. *Leaves*: petioles 3–5 cm long on leaves at mid-plant (lower leaves not seen), 0.6–5 cm long on upper leaves, retrorse-aculeate and with fine and dense simple hairs, the blades on leaves at mid-plant 5–7 × 6–7 cm, moderately to deeply palmately 3–5-lobed, the midlobe broadly lanceolate to ovate or obovate, the lateral lobes broadly lanceolate to triangular or ovate, the outer lobes vestigial to broadly lanceolate, the blades on upper leaves 2–6.5 × 2–5.2 cm, moderately to deeply 3-lobed, midlobe and lateral lobes ovate, blades of all leaves abaxially with or without retrorse aculei and with simple to stellate hairs on ribs and veins, adaxially with mostly simple hairs (some to 4-fid) on ribs and veins, the base cuneate to truncate, the margin finely serrate to dentate, the apex obtuse to acute or acuminate, the nectary 1–2 mm long, slit-like, inconspicuous. *Flowers* axillary, solitary, and sometimes clustered near the ends of flowering branches; peduncles 0.6–1 cm long in flower, up to 2 cm long in fruit, articulating 1–5 mm below the epicalyx, below the articulation almost glabrous, above the articulation retrorse-aculeolate and with a few, fine 1–2-fid hairs; involucellar bracteoles 8–10, 7–9 mm long below the apex, linear, 3-nerved, with fine, sparse simple to 3-fid hairs and coarse simple bristles borne on enlarged bases, the apex bifurcate, the outer fork 5–8 × 2–3 mm, lanceolate to ovate or foliate, 3-nerved, the inner fork 4–7 mm long, linear, flattened, the base free; calyx 1.2–1.5 cm long in flower, up to 2.1 cm long in fruit, the lobes lanceolate to ovate, acuminate, with or without aculei, and with sparse simple bristles on ribs, otherwise almost glabrous, the nectary absent; corolla yellow with a maroon(?) centre. *Capsules* 13–16 × 11–14 mm, densely

appressed-pubescent, the beak 2–5 mm long, conspicuous and glabrous, or inconspicuous and covered with appressed hairs; seeds unknown.

Open jungle and dense forest, locally abundant.

DISTRIBUTION. India and Thailand. **India**, without locality or date, *Dalzell* s.n. (K); without locality or date, *Hooker & Thomson* s.n. (BM); Waghai, forest, Dangs, 22 October 1955, *Santapau* 19958 (BR). **Thailand**, Doi Sutēp, 27 October 1912, *Kerr* 2768 (BM); Bān Tākī, 10 November 1922, *Marcan* 1078 (BM).

Much confusion exists in the literature about the name *Hibiscus furcatus*. Willdenow published the name in 1809 for an Indian plant, as did Roxburgh in 1814. Many authors have presumed that these names refer to the same species. However, both Paul & Nayar (1980, 1988: 124) and Pradeep & Sivarajan (1991), after having examined a photograph of the original type material of *H. furcatus* Willd. (which I have done also), pointed out that the epithet refers to two different species and that the name *H. furcatus* Roxb. is an illegitimate later homonym of Willdenow's name. Paul & Nayar (1980) took up the name *H. aculeatus* Roxb. as the correct epithet for the Roxburgh plant. However, Pradeep & Sivarajan (1991) pointed out that *H. aculeatus* Roxb. is also an illegitimate later homonym of *H. aculeatus* Walter. Pradeep & Sivarajan (1991) took up the name *H. hispidissimus* Griff. as the correct epithet, and published an excellent illustration for the common Indian species that is usually called *H. furcatus* Roxb. The true *H. furcatus* Willd. is genuinely different from *H. hispidissimus*, but it seems to occur much less commonly.

8. ***Hibiscus sudanensis*** Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 10: 18 (1906). Type: Central African Republic, territoire de l'Oubangui entre la porte de la Noaca et le fort Sibut, 10 December 1903, *Chevalier* 10757 (P!-holotype; G!-isotype). Fig. 2E.

Hibiscus sudanensis var. *genuinus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 10: 19 (1900), nom. illeg. (Art. 26.2).

Hibiscus sudanensis var. *glabrescens* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 10: 19 (1900).

Hibiscus sudanensis var. *glabrescens* forma *grandiflorus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 10: 20 (1900). Type: 'Central Africa', collector and locality unknown, identified by 'XZ063' (P!-holotype).

Hibiscus sudanensis var. *glabrescens* forma *minoriflorus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 10: 20 (1900). Type: Central African Republic, territoire du Chari: vallée du Boro, 2 January 1903, *Chevalier* 7104 (P!-holotype; G!-isotype).

Hibiscus rostellatus var. *congolanus* Hauman in *Bull. Jard. Bot. État* 31: 86–87 (1961). Type: Democratic Republic of Congo (Zaire), District Forestière Centrale, Yangambi, December 1937, *Louis* 7032 (BR!-holotype & isotype).

Hibiscus rostellatus var. *sudanensis* Hauman, *Fl. Congo belge* 10: 119 (1963).

Variously described as a *shrub*, *shrubby climber*, or a trailing woody *vine* with long internodes, scarcely branched; stems green tinged with pink, or pink, with sparse, fine retrorse aculei, and with or without a line of pubescence. *Stipules* 3–6(–9) mm long, filiform to linear, usually with fine hairs on margins. *Leaves*: petioles 2–9 cm long, with pubescence like that of the stems, the blades 6–10 × 3–8 cm, unlobed or incipiently 3-lobed, deltoid to lanceolate, ovate, or cordate, abaxially with or without retrorse aculeoli on the ribs, abaxially and adaxially with sparse, simple to stellate hairs on ribs and veins, or densely stellate-tomentose, the base truncate to cordate, the margin shallowly dentate (almost entire) or serrate, the

apex short- to long-acuminate, the nectary 1–5 mm long, slit-like. *Flowers* axillary, solitary or clustered near the ends of short flowering branches; peduncles 0.3–0.9(–1.5) cm long, articulating near the base to about one-third the distance from the base to the epicalyx, with or without retrorse aculeoli and simple to several-fid bristles; involucellar bracteoles 8–12, 9–11 mm long, linear, with fine simple or stellate hairs and with or without simple to 3-fid bristles on enlarged bases, the apex bifurcate, the outer fork 1.5–5 mm long, narrowly to broadly lanceolate, reflexed, the inner fork 2–9 mm long, linear to subulate, ascending; calyx 1.3–1.9 cm long, the lobes lanceolate to ovate, acute to acuminate, with simple to 4-fid bristles on the ribs, glabrous or finely stellate-pubescent between the ribs, the nectary absent; corolla lemon yellow with a large conspicuous purple centre, the petals 4–5 × 2–3 cm, obovate, finely stellate-pubescent dorsally, glabrous ventrally; staminal column 19 mm long, streaked dark pink and white, the filaments 3 mm long, the staminal column and filaments covered with very small red-purple clavate hairs, the anthers and pollen yellow; style branches 9 mm long, dark pink; stigmas dark red-purple. *Capsules* up to 17 × 15 mm, ovoid, densely appressed-pubescent, the beak 1–2 mm long (sometimes absent?), glabrous; seeds 4 × 3 mm, reniform, dark brown, faveolate and with pectinate scales, the funiculus light tan, glabrous. Chromosome number, $n = 18$.

Riverbanks, marshy prairies, swamps, swampy forests.

DISTRIBUTION. **Fig. 5.** Central Africa, Cameroon to Democratic Republic of Congo. **Cameroon**, sur la rivière Ziege près de Djemiong (50 km SW de Batouri), 18 April 1962, *Letouzey* 4794 (P). **Central African Republic**, Ruisseau près Riv. Eôwe, 40 km N. Alindao, 24 November 1927, *Tisserant* 2327 (BM-2 sheets; BR-2 sheets; P); Haut Oubangui, Région de Yalinga, 25 December 1922, *LeTestu* 4247 (BM, P). **Democratic Republic of Congo**, Leopoldville Prov., Inburbain, Kimuenza, 3 December 1956, *Carlier* 325 (BR, K); Uele, Station Domest. Elephants, 16 November 1942, *Offerman* 625 (BR); Ango, November 1945, *Germain* 4322 (BR); Gandajika, 29 April 1957, *Liben* 2813 (BR).

9. ***Hibiscus flavo-roseus*** Baker f. in *J. Bot.* 77: 20 (1939). Type: Angola, Lunda: Saurimo, without date, *Young* 646 (BM!-holotype). Fig. 1F.

Shrub up to 1.2 m tall; stems retrorse-aculeolate, sparsely and finely stellate-pubescent below, more densely stellate-pubescent above. *Stipules* 2 mm long, linear, flattened, a few hairs on margins. *Leaves*: petioles 0.3–2 cm long, with pubescence like that of the stem, the blades of leaves at mid-plant and upper leaves (lower leaves not seen) 1–6.5 × 0.8–6.5 cm, the blades of leaves at mid-plant deeply 3–5-lobed, the midlobe longer (sometimes markedly so) than the lateral lobes, the blades of upper leaves narrowly ovate to 3-lobed, all blades densely and finely cinereo-stellate-pubescent abaxially, sparsely stellate-pubescent adaxially, the base truncate to cordate, the margin serrate, the apex obtuse to acute, the nectary up to 4 mm long, slit-like. *Flowers* clustered at the summit of long flowering branches or borne singly or in small clusters on short secondary branches; peduncles 0.3–0.6 cm long in flower, apparently articulating at the base, with pubescence like that of the stem; involucellar bracteoles 10, 6–7 mm long below the apex, linear, long-bristly above, the apex bifurcate, the outer fork 2 mm long, broadened, recurved, the inner fork 5 mm long, linear, ascending; calyx 1.4–1.6 cm long in flower, the lobes triangular, acute, with very fine, dense stellate pubescence and a few coarse 2-fid to stellate hairs on the marginal ribs, the nectary absent; corolla yellowish pink (according to the collector) with a purple centre, the petals c. 3 cm long. *Capsules* and seeds unknown.

DISTRIBUTION. **Fig. 5.** Angola. Known to me only from the type collection.

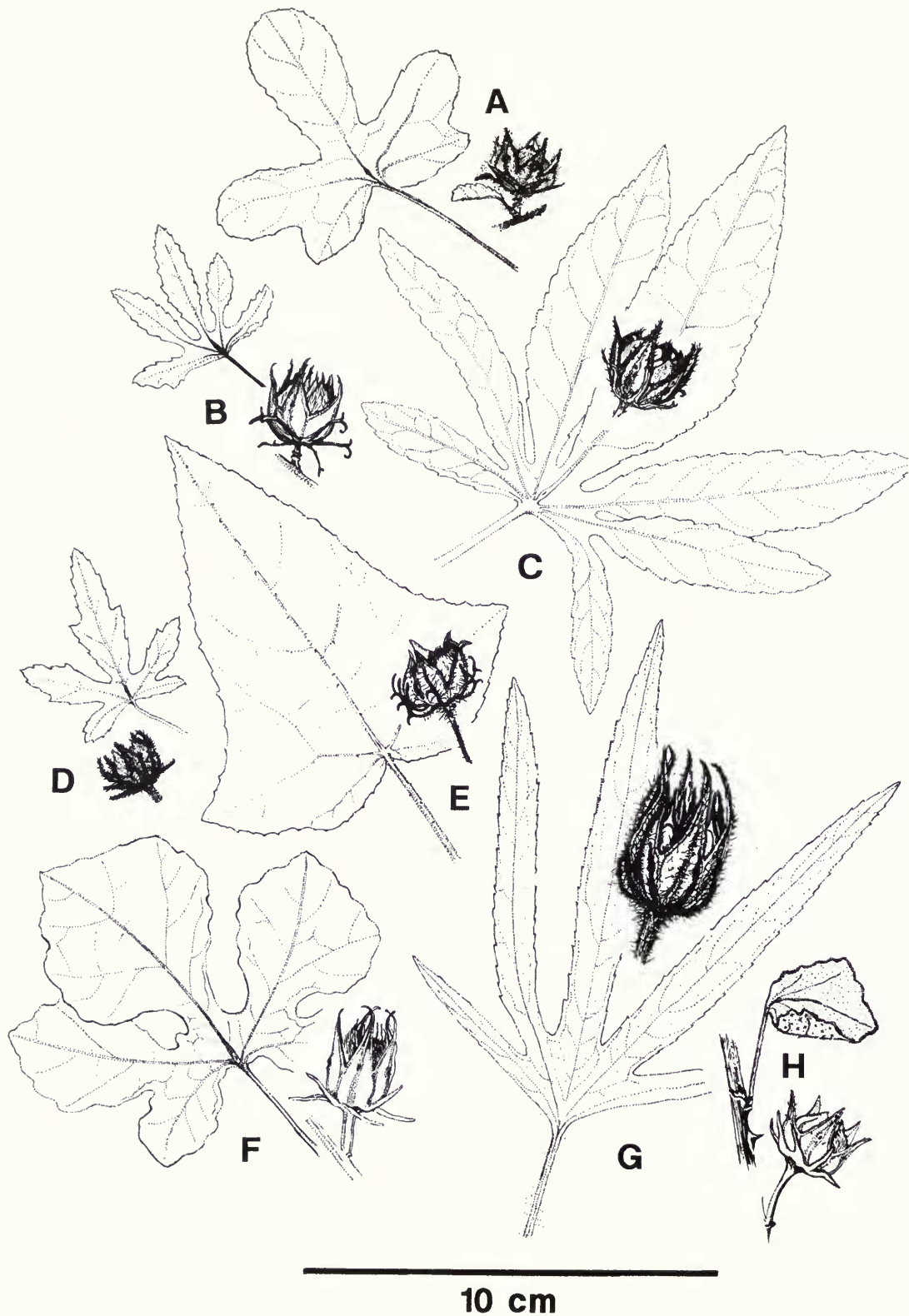


Fig. 2 Leaves and fruits of species of *Hibiscus* section *Furcaria*. **A:** *H. parvilobus*, Spjut & Ensor 3184 (ASU); **B:** *H. acetosella*, leaf: Gossweiler s.n. (BM), fruit: Welwitsch 5271 (BM); **C:** *H. asper*, leaf: Dalziel 426 (K), fruit: De Saeger 1038 (K); **D:** *H. reekmansii*, Troupin 16264 (BR); **E:** *H. sudanensis*, Tisserant 2327 (BM); **F:** *H. greenwayi*, leaf: Polhill & Paulo 835 (BR), fruit: Hooper & Townsend 1094 (K); **G:** *H. mechowii*, Exell & Mendonça 1538 (BM); **H:** *H. sparseaculeatus*, leaf: Gillett 13198 (K), fruit: Ash 2783 (K).

10. *Hibiscus radiatus* Cav., *Diss.* 3: 150, t. 54, f. 2 (1787). Type: Paris, cult. from seeds collected by Banks, *Cavanilles* s.n. (P-holotype).

Hibiscus unidens Lindl. in *Bot. Reg.* 9: t. 878 (1823). Type: *Bot. Reg.* 9: t. 878 (holotype).

Hibiscus lindleyi Wall., *Pl. asiat. rar.* 1: 4, t. 4 (1830). Type: Burma, Segaing on Mt. Taung Dong, *Wallich* 1895–1 (K-lectotype, according to Borssum-Waalkes, 1961; G!-isotype-2 sheets).

Hibiscus furcatus Moritz, *Syst. Verz.*: 29 (1846), non Roxb. (1814).

Hibiscus cannabinus Mast. in Oliver, *Fl. trop. Afr.* 1: 204 (1868), non L. (1759), pro parte quoad syn. *H. radiatus*.

Hibiscus radiatus var. *lindleyi* (Wall.) Kurz in *J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist.* 43: 110 (1874).

Hibiscus cannabinus Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 114 (1900), non L. (1759), pro parte syn. *H. radiatus*, *H. unidens*, *H. lindleyi*.

Hibiscus cannabinus var. *unidens* (Lindl.) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 115 (1900).

Hibiscus cannabinus Merr. in *Philipp. J. Sci.* 3: 244 (1908), non L. (1759).

Hibiscus cannabinus var. *radiatus* (Cav.) Chiov. in *Atti Ist. Bot. Univ. Pavia* ser. 4, 7: 125–126 (1936).

Illustrations: Sims, *Bot. Mag.*: t. 5098 (1859); Paul & Nayar, *Fasc. Fl. India* 19: 145, fig. 30 (1988); Icones Roxburghianae no. 1584 (K).

Erect, branched *herb* or *subshrub* to 2 m tall; stems tinged red, glabrous or sometimes sparsely aculeate. *Stipules* 8–12 mm long, linear to lanceolate. *Leaves*: petioles 2–11(–15) cm long, sparsely aculeate or glabrous, the blades 2–12 × 1.5–12 cm, deeply palmately 3–5(–7)-lobed, glabrate, the base cuneate, truncate, or subcordate, the margin coarsely serrate, the apex acuminate, the nectary absent. *Flowers* axillary, solitary; peduncles 0.2–0.5(–1.3) cm long, articulating near the base to about halfway between the base and the epicalyx, glabrous to pubescent below the articulation, bristly above it; involucellar bracteoles 8–10, 10–15 mm long, spreading, linear, sparsely bristly, the apex bifurcate (or rarely entire or obscurely bifurcate), the outer fork 4–5 mm long, narrowly lanceolate, the inner fork usually shorter, linear, the base free; calyx 1.5–3 cm long, the lobes lanceolate, long-acuminate, sparse-bristly on the ribs, essentially glabrous otherwise, or minutely pubescent below, the nectary absent; corolla red-purple, or more rarely yellow, with a deep purple centre, the petals 6–7 × 3–4 cm, obovate, finely and sparsely pubescent dorsally, glabrous ventrally; staminal column 25–30 mm long, the filaments 2 mm long, the anthers purple, the pollen yellow-brown; style branches 2–3 mm long, red; stigmas red-purple. *Capsules* 20–25 × 15–22 mm, ovoid, densely appressed-pubescent, the beak 3 mm long, glabrous; seeds 4 × 3 mm, subreniform, dark brown, faveolate and beset with minute pectinate scales, the funiculus small, inconspicuous, glabrous. Chromosome number, $n = 36$.

DISTRIBUTION. Apparently Indian in origin (an amphidiploid species, possibly from hybridization of *Hibiscus cannabinus* with *H. surattensis*: Menzel, 1986: 452), but now widely cultivated. **Central African Republic**, Chari, 21 November 1902, *Chevalier* 6347 (G); Oubangi-Chari, 10 November 1924, *LeTestu* 1687 (BM). **India**, Assam, November 1890, *Dr King's Collectors* s.n. (CAL); Coromandel, without date, *Mace* s.n. (P); India, without precise locality or date, *Roxburgh* s.n. (BM). **Burma**, Minlen, 1902, *Shaik Mokim* 548 (G); *Wallich* 1895c (BM). **Vietnam**, 'Cochinchine', without precise locality or date, *Pierre* 3735 (P-2 sheets). **Indonesia**, 'North Borneo', without precise locality, 1877–78, *Burbridge* s.n. (BM); Java, without precise locality or date, *Zollinger* 1248 (BM).

Widely cultivated in both the Old and New Worlds. Whether it ever appears as a truly wild plant is unknown. Saldanha (1985) described it as being 'frequent in deciduous forests' in Karnataka, India. Borssum Waalkes (1966) noted that it was both cultivated and ruderal in Malesia. Fryxell (1988, 1992) states that it is sometimes naturalized in Mexico and Ecuador.

11. *Hibiscus torrei* Baker f. in *J. Bot.* 75: 101 (1937). Type: Mozambique: Niassa, Vila Cabral, July 1934, *Torre* 435 (COI-holotype; BM!-isotype, 2 sheets; G!-photograph). Fig. 1G.

Shrub or much-branched perennial *herb*; stems with many stout retrorse aculei and lines of dense stellate pubescence and soft simple hairs. *Stipules* 4–5 mm long, subulate to lanceolate, with a few small fine hairs. *Leaves*: petioles 0.5–4.5 cm long, with pubescence like that of the stems, the blades 4.5–10 × 5.5–10 cm, palmately shallowly 3–5-lobed, scabrous, abaxially retrorse-aculeolate on the midrib and lateral ribs and veins, adaxially without the aculeoli, the base truncate to cordate, the margin coarsely dentate, the apex acute to obtuse, the nectary apparently absent. *Flowers* solitary, axillary or sometimes clustered near the apex of flowering branches; peduncles 0.4–0.8 cm long, articulating at the base, with long rigid hairs on enlarged bases and some finer simple or stellate hairs; involucellar bracteoles 8–10, 6–7 mm long below the apex, linear, flattened, finely stellate-pubescent and with a few longer hairs on bases, the apex bifurcate, the outer fork 3–4 mm long, broadly lanceolate to ovate, with a prominent midvein, the inner fork 4–6 mm long, linear to subulate, the base free; calyx 1.7–2.2 cm long, the lobes triangular, acute, finely stellate-pubescent on the ribs and with matted long hairs on enlarged bases and a few aculei on the margins, the nectary absent; corolla yellow with a purple centre, the petals 3–5 cm long, obovate, sparse, simple and stellate-pubescent dorsally, glabrous(?) ventrally. *Capsules* 19–20 × 15–17 mm, densely appressed-pubescent, the beak 1 mm long, glabrous; seeds subreniform, the surface faveolate (according to Exell, 1961).

Damp places (Exell, 1961).

DISTRIBUTION. Fig. 5. Southern Tanzania to northern Mozambique. **Mozambique**, (type collection). **Tanzania**, Iringa: Mufindi Dist., Uhafiwa, 3 August 1989, *Kayombo* 795A (TEX); Iringa: Mufindi Dist., Luhega forest near Uhafiwa, 10 June 1989, *Lovett et al.* 3287 (TEX).

12. *Hibiscus noldeae* Baker f. in *J. Bot.* 77: 20 (1939). Type: Angola, Malange, Quela, April 1938, *Nolde* 713 (BM!-holotype). Fig. 1H.

Hibiscus eetveldeanus var. *asperatus* de Wild. in *Bull. Jard. Bot. État* 3: 279 (1911). Type: Democratic Republic of Congo (Zaire), Kasai, Katola, April 1908, *Sapin* s.n. (BR!-holotype).

Hibiscus mechowii Exell & Mendonça, *Cons. fl. angol.* 1(2): 376 (1951), non Garcke (1881), pro parte quoad specim. *Milne-Redhead* 4100.

Hibiscus furcatus Mullend. in *Publ. Inst. Natl. Étude Agron. Congo Belge, Sér. Sci.* 61: 79 (1954), non Roxb. (1814).

Illustration: Maquet, *Fl. rwand.* 2: 383, fig. 121, 6A, 6B (1983).

Various described as a *herb* to 1.5 m tall, a *shrub* to 3 m tall, or a *climber* with stems to 4 m long; stems retrorse-aculeate and with simple hairs or sometimes stellate-pubescent, more dense near the apex. *Stipules* 5–11 mm long, lanceolate to narrowly ovate, with fine short hairs on the margins. *Leaves*: petioles 1–11 cm long, retrorse-aculeolate and with long, mostly simple hairs, more dense on the adaxial surface, the blades 1–9 × 0.2–10 cm, on lower leaves deeply

palately 3–5-lobed, the midlobe and lateral lobes lanceolate or oblanceolate, the outer lobes vestigial to lanceolate or ovate, the blades on uppermost leaves bract-like, all blades abaxially retrorse-aculeolate and with simple to 4-fid hairs on ribs, mostly simple hairs on veins, adaxially with simple to 4-fid hairs on ribs and veins, the nectary 2 mm long, conspicuous. *Flowers* axillary, solitary; peduncles 0.2–1.2 cm long, articulating from near the base to c. halfway between the base and epicalyx, densely fine-pubescent below the articulation, aculeolate and sparsely puberulent above the articulation; involucellar bracteoles 8–10, 7 mm long below the apex, linear to subulate, with long simple hairs or bristles on enlarged bases, mostly on margins, the apex bifurcate, the outer fork 3–6 mm long, lanceolate, not reflexed, the inner fork 1–6 mm long, linear to subulate, the base free; calyx 1.5–2.5 cm long, the lobes triangular, long-acuminate, with simple hairs or bristles on purple enlarged bases plus finer simple to 2-fid hairs, mostly on ribs, more dense below, the nectary < 1 mm long, inconspicuous; corolla yellow with a dark red to purple centre, the petals 2.5–5 × 2–2.5 cm, obovate, sparsely stellate-pubescent dorsally, glabrous ventrally. *Capsules* 14–20 × 11–15 mm, densely appressed-pubescent, the beak 1–2 mm long, glabrous; seeds 3 × 2 mm, reniform, dark brown, faveolate and with pectinate scales, the funiculus small, inconspicuous, glabrous. Chromosome number, $n = 36$ (Kachecheba, 1972).

Ruderal and wild, in plantations and fallow land, in savannas, edges and clearings in forests, river banks and swamps; apparently sometimes cultivated for fibre and young leaves.

DISTRIBUTION. **Fig. 4.** Western to eastern central Africa, from Sierra Leone to Ethiopia and south to Angola and Zambia. **Sierra Leone**, c. 5 miles from Kamarea on Kurubonla road, 14 November 1965, *Morton* SL2486 (K). **Ivory Coast**, Mt. Nimba, 14 December 1967, *Geerling & Bokdam* 1713 (BR). **Nigeria**, NE State, Sardauna Prov., Mambilla Plateau, 9 October 1973, *Chapman* 3249 (K). **Cameroon**, cult., 6 km W. of Bandjoun, 26 August 1972, *Leeuwenberg* 10288 (BR); 36 km N. de Bafia, 22 November 1969, *Letouzey* 9600 (P); Bamenda, 2 February 1928, *Migeod* 463 (BM). **Central African Republic**, Oubangui, Région de la Waka, 10 November 1924, *Tisserant* 1687 (P). **Sudan**, Mongalla Prov., S. of Juba-Yei road between Libogo and Yei, 23 February 1934, *Dandy* 485 (BM). **Ethiopia**, c. 40 km N. of Lekemti, ...tributary of Angar River, 13 November 1965, *deWilde & deWilde-Duyffes* 8866 (B, BR, P). **Democratic Republic of Congo**, Nioka, 1932, *Jurion* 128 (BM-2 sheets); Kivu Prov., Kabare Terr., Birava, 30 April 1960, *Meurillon* 819 (BR); Kaniama-Haut Lomani, 10 June 1947, *Mullenders* 290 (BR). **Uganda**, SE of Kampala, N. of Nioka, 30 April 1952, *Sperry* 553 (BR). **Rwanda**, Butare pref., Gihindansuyagu, 8 June 1978, *Raynal* 20345 (P). **Burundi**, Ruyigi: Muzire, 2 May 1980, *Reekmans* 8981 (K). **Angola**, Moxico, E. of Lusavo Falls, 13 January 1938, *Milne-Redhead* 4100 (BM, BR). **Zambia**, Kawambwa Dist., Mbereshi River swamp, 20 April 1957, *Richards* 9371 (BR).

One collection from Cameroon, *Letouzey* 9600 (P), has unusually long involucellar bracteoles which equal the calyx in length at anthesis.

13. **Hibiscus nigricaulis** Baker f. in *J. Bot.* 77: 19–20 (1939). Type: Angola, Bié: between Coimba and R. Cuanza, 7 May 1937, *Exell & Mendonça* 1759 (BM!-holotype). Fig. 1E.

Hibiscus cannabinus Ulbr. & R.E. Fries in R.E. Fries, *Wiss. Ergebn. Schwed. Rhod.-Kongo-Exped.* 1: 145 (1914), non L. (1759), pro parte quoad specim. *Fries* 954.

Hibiscus cf. *diversifolius* Verdoorn & Collett in *Farming South Africa* 34: 2, fig. 2 (1947), non Jacq. (1789).

Hibiscus sabdariffa Mendonça & Torre, *Contr. Conhec. Fl. Mocamb.*

1: 11 (1950), non L. (1753), pro parte quoad specim. *Mendonça* 332 (LISC).

Hibiscus meeusei Exell in *Bol. Soc. Brot.*, ser. 2, 33: 165 (1959).

Type: South Africa, Transvaal, Bronkhorstspuit Dist., Donkerhoek (Donkerpoort), between Pretoria and Bronkhorstspuit, 19 March 1959, *Meeuse* 10646 (BM!-holotype; G!, P!-isotypes).

Illustration: (as *Hibiscus* cf. *diversifolius*) Verdoorn & Collett, *Farming South Africa* 34: 2, fig. 2 (1947).

Annual (sometimes biennial?) herb to 1.5 m tall; stems aculeolate and stellate-pubescent. *Stipules* 4–10 mm long, filiform to narrowly subulate, with short, fine pubescence. *Leaves*: petioles 1–12 cm long, with pubescence like that of the stems, the blades 2–12 × 0.2–1.5 cm, those of lower leaves deeply palmately 3–7(–9)-lobed, the lobes oblanceolate, obovate, or triangular, sometimes secondarily lobed, the blades of upper leaves less deeply lobed or even bract-like at the apex, all blades with fine simple and stellate hairs abaxially and adaxially, the base cuneate, truncate, or very shallowly cordate, the margin regularly to irregularly serrate, the apex obtuse to acute, the nectary 1–4 mm long, slit-like. *Flowers* axillary, solitary, or clustered on short-to-long flowering branches, the short flowering branches with a subtending, bract-like leaf with a nectary borne above the axillary leaf; peduncles 0.4–0.7 cm long, articulating at the base, with pubescence like that of the stems; involucellar bracteoles 8–9(–12?), 8–10 mm long, linear, flattened, finely stellate-pubescent and with coarse bristles on enlarged bases mainly on the margins, the apex obscurely bifurcate, the outer fork 2 mm long, reflexed, the inner fork < 0.5 mm long, vestigial, or sometimes absent, the base free or slightly united; calyx 1.4–2.0 cm long, the lobes lanceolate to ovate, more or less acuminate, finely stellate-pubescent and with coarse bristles on bases, mostly on the ribs, the nectary 1 mm long, usually conspicuous; corolla cream to light yellow, with a pinkish red to dark red-purple centre, the petals 2–4 × 1.5–3 cm, obovate, glabrous to stellate-pubescent dorsally, glabrous ventrally; staminal column 10–14 mm long, pink or red, the filaments 0.5 mm long, the anthers pink or purple, the pollen yellow or tan; style branches included in staminal column or exerted up to 1 mm long; stigmas red-purple, usually not exerted beyond the anthers. *Capsules* 14–18 × 11–16 mm ovoid, densely appressed-pubescent, the beak 1–2 mm long, glabrous; seeds 3–4 × 2–3 mm, subreniform, dark brown, finely faveolate and with sparse pectinate scales, the funiculus small, dark brown, glabrous. Chromosome number, $n = 36$.

Ruderal and wild, in old cultivated lands and waste places, disturbed native vegetation, moist places and marshland.

DISTRIBUTION. **Fig. 4.** Southern Africa from Angola, Zambia, and Mozambique to South Africa. Hauman (1963) also cites several specimens (as *H. meeusei*) from southeastern Democratic Republic of Congo (Zaire), none of which I have seen. **Angola**, Huila, Humpata, 24 April 1964, *de Menzies* 1061 (BM); Okavongo Nat. Terr., Okavongo River at Dujona Camp, 2 miles E. of Nyangana Mission Station, 18 February 1956, *deWinter & Marais* 4757 (BM). **Zambia**, Kasama Dist., 80 km S. of Kasama, 29 April 1962, *Robinson* 5121 (B); NW Dist., near Kitwe Railway Station, 8 April 1961, *Linley* 133 (BM); Ndola [North], 20 March 1954, *Fanshawe* 979 (K); Lusaka Dist., April 1957, *Noak* 193 (BM); S. Prov., Kalomo Dist., 18 March 1962, *Astle* 1516 (K). **Mozambique**, Manica E. Sofola, Chimoio, Garuso, 3 March 1948, *Barbosa* 1086 (BR). **Zimbabwe**, Lomagundi, Umboi Valley, 28 March 1950, *Colville* 108 (BM); Odzani Banks, March 1935, *Gilliland* 1721 (BM); Victoria Falls, May 1915, *Rogers* 13157 (BM). **Namibia**, Tsumeb, April 1934, *Dinter* 7588 (BM); Grootfontein Nord, zwischen Numkaub und Bumbi im Omuramba, 5 March 1958, *Merxmüller & Giess* 1827 (BM). **South Africa**, Transvaal, Waterberg, 4 km Kienaars River Station, 18 March 1947, *Codd* 2749 (BM, PRE); Transvaal, Kwandebele, farm Gembokfontein, 17

March 1981, *Hoepen* 1627 (PRE); Transvaal, Zoutpansberg Dist., c. 2 mi W. of Hangklip along road to Buckworth, 4 April 1957, *Meeuse* 10234 (BM); Natal, 14 July 1929, *Salter* 382/12 (BM); Natal, Port Shepstone, Izotaha ravine, 8 July 1967, *Strey* 7551 (PRE).

14. *Hibiscus mechowii* Garcke in *Linnaea* 43: 121 (1881). Type: Angola, Cuanza Norte, without date, *Mechow* 105 (B-holotype; BM!-drawing).

Fig. 2G.

Hibiscus lancibracteatus de Wild. & T. Durand in *Bull. Soc. Roy. Bot. Belgique* 38(2): 25 (1899). Type: Democratic Republic of Congo (Zaire), Coquilhatville, 17 February 1896, *Dewèvre* 752 (BR!-holotype).

Hibiscus cannabinus Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 114 (1900), non L. (1759), pro parte quoad syn. *H. mechowii* (4: 115).

Illustration: (as *H. lancibracteatus*) de Wild. & T. Durand, *Ann. Mus. Congo*, sér. 1, Bot. 1: 147, t. 84 (1901).

Herb or *shrub* to 2 m tall; stems aculeolate and with long fine simple hairs and lines of pubescence. *Stipules* 10–20 mm long, filiform to linear, almost glabrous. *Leaves*: petioles 2–7 cm long, aculeolate and with long simple hairs, the blades 4–10 × 3–8 cm, very deeply palmately 3–5-lobed, the lobes linear, or rarely, shallowly lobed (e.g. *Nannan* 24) both surfaces covered with fine simple hairs plus a few stout hairs on enlarged bases on ribs, the base cuneate, the margin serrate or with minute antrorse barbs, the apex acute, the nectary 3 mm long, slit-like. *Flowers* axillary, solitary; peduncles 0.5–1.2 cm long, articulating at the base, with dense short woolly pubescence and long simple hairs; involucellar bracteoles 9–10, 11–22 mm long, with long simple hairs and pigmented stout bristles, linear below the apex, the upper 6–11 mm channelled on the ventral surface, several-nerved on the dorsal surface, becoming lance-shaped upon drying, the apex entire, pointed, the base united; calyx 2–3 cm long, the lobes broadly lanceolate, acuminate, with long simple matted hairs, mostly on the ribs, the nectary absent; corolla lemon yellow with a large red-brown centre, the petals 4–6 × 2–3.5 cm, obovate, glabrous dorsally and with a few simple hairs ventrally; staminal column 15 mm long, light pink, the filaments 1 mm long, the anthers purple, the pollen brownish red; style branches included in the staminal column or to 3 mm long; stigmas white to red. *Capsule* 20–26 × 15–18 mm, ovoid, densely appressed-pubescent, the beak 5 mm long, pubescent; seeds 4 × 3 mm, subreniform, with sparse fine matted hairs. Chromosome number, $n = 18$.

Ruderal and wild (rarely cultivated?), in abandoned plantations or cultivated fields, wooded steppes, savannas, sandy, shady river banks, swampy alluvial plains. In Central African Republic, the stem fibres are reportedly used for making fish nets and wrapping steamed manioc (*Fay* 5295 (K)).

DISTRIBUTION. **Fig. 4.** Central and southern Africa, Central African Republic to Namibia, Botswana, Zimbabwe, and Mozambique; apparently disjunct in extreme western Africa. **Guinea-Bissau**, Bissau, Quinhame, 17 November 1960, *Raimundo & Guerra* 48 (K). **Senegal**, Region de Bignona, Tèndouk, 13 December 1963, *Berhaut* 6773 (P). **Central African Republic**, Territoire du Chari, 2 December 1902, *Chevalier* 6546 (P); Bossangoa, 10 October 1981, 600 m, *Fay* 5295 (K); Monova-Gounda-St. Floris Nat. Park, 1 November 1983, *Fay* 6102 (K); Haute-Kotto, Yalinga, 9 October 1921, *LeTestu* 3339 (BM); Oubangui, Region de Bambari, 10 October 1923, *Tisserant* 1246 (P). **Democratic Republic of Congo**, Kivu Prov., Uvira Terr., Uvira, 8 June 1956, *Kinet* 148 (BR); Terr. Popokabaka, Kinata, 25 April 1959, *Pauwels* 2661 (BR); cultivated, prés village Bonananga, 22 October 1913, *Nannan* 24 (BR); Democratic Republic of Congo, without locality, August 1914, *Vanderyst* 3972 (BM). **Burundi**, Bubanze, Randa, 5 June 1980, *Reekmans* 9267 (K).

Tanzania, T4, Lukoma, Kigoma Dist., L. Tanganyika, 29 May 1975, Kahurananga, *Kibuwa & Mungai* 2688 (BR); Bezirk Lindi, 50 km W. Lindi, 24 April 1935, *Schlieben* 6485 (BM). **Angola**, Moxico, River Luena, near Vila Luso, 3 May 1937, *Exell & Mendonça* 1538 (BM); Pungo Adongo, April 1857, *Welwitsch* 5262 (BM). **Zambia**, Bulaya, June 1950, *Bullock* 2910 (BR); Abercorn Dist., Kawi Village, 19 May 1936, *Burt* 6147 (BM); Zambesi, Gonyé, 28 April 1925, *Pocock* 170 (BOL); Namwala Dist., 1934–35, *Read* 54 (BM); Abercorn Dist., Chilongowelo, 10 May 1952, *Richards* 1697 (K); Bulaya, NE of Mweru-Wantipa, 11 August 1962, *Tyrer* 401 (BM). **Namibia**, Okavango Native Territory, 4 March 1956, *de Winter & Marais* 4973 (PRE); Grootfontein-Nord, Südlich Mavanze, im Omuramba, 5 March 1958, *Merxmüller & Giess* 1871 (BM). **Zimbabwe**, Victoria Falls, May 1915, *Rogers* 13155 (BOL).

15. *Hibiscus subdiversifolius* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 20: 83–85 (1916). Type: Madagascar, loco collectore haud indicato, n. 22 (G!-holotype).

Hibiscus diversifolius var. *subdiversifolius* Hochr., *Fl. Madagasc., Malvac.*: 40–41 (1955).

Illustration: Hochreutiner, *Fl. Madagasc., Malvac.*: 39, fig. XI, 1–2 (1955).

Shrub 3–4 m tall; stems aculeate and very densely tomentose. *Stipules* 4 mm long, filiform, with dense, short pubescence. *Leaves*: petioles 0.5–10 cm long, very densely tomentose, the blades 1.5–12.5 × 0.5–14.5 cm, lanceolate to ovate or very shallowly 7-lobed, abaxially and adaxially densely stellate-pubescent, the base cuneate, truncate, or deeply cordate, the margin serrate or dentate, the apex acute to acuminate, the nectary 1.5 mm long, slit-like. *Flowers* apparently clustered near the apex of the stem; peduncles 0.6 cm long, articulating midway between the base and the epicalyx, densely short-tomentose below and above the articulation, and with long simple hairs above it; involucellar bracteoles 6(?), 10 mm long, linear, flattened, channelled on the ventral surface, densely tomentose, the apex entire, the base free; calyx 1.5–1.7 cm long, the lobes triangular, acuminate, densely and finely stellate-pubescent and with long, simple to stellate(?) hairs, mainly on the ribs, the nectary apparently absent; corolla colour unknown, but with dark-coloured centre, the petals 5.5 × 2 cm, obovate, finely stellate-pubescent dorsally, glabrous ventrally; staminal column tan, filaments 1 mm long, anthers purple. *Capsules* and seeds unknown.

Riverbanks and vicinity (Hochreutiner, 1955).

DISTRIBUTION. **Fig. 5. Madagascar.** I have seen only the type collection which cites Madagascar without specific locality, but Hochreutiner (1955) lists two *Perrier* collections (5343, 5464) from western Madagascar.

The specimen mounted on *Dale* 2479 (G!), collected at the Nairobi, Kenya arboretum in September 1930, is *Hibiscus subdiversifolius* even though the label states that the plant was collected originally near Embu, Kenya, and was identified as *Hibiscus* sp. near *H. panduriformis* Burm.; a later label identifies the plant as *Hibiscus diversifolius* Jacq.

16. *Hibiscus berberidifolius* A. Rich., *Tent. fl. abyss.* 1: 56 (1847). Type: Ethiopia (Abyssynia), *Quartin Dillon et Petit* s.n. (P!-lectotype, Wilson, 1983; BR!-isolectotype).

Hibiscus diversifolius var. *witteanus* Hochr. in Robyns, *Bull. Jard. Bot. État* 10: 276 (1947). Type: Democratic Republic of Congo (Zaire), Kilisti, route de Kibumba, forêt, 17 January 1934, *de Witte* 1320 (G!-holotype; BR!-isotype); Tshamugussa, 9 August 1934, *de Witte* 1817 (BR!, G!-paratypes).

Illustrations: Maquet, *Fl. rwand.* 2: 383, fig. 121, 2A, 2B (1983); Wilson, *Brittonia* 35: 176, fig. 1 (1983).

Robust, few to many-branched perennial *shrub*, 1–4 m tall; stems sparsely to moderately aculeate, lower and mid-stem with a longitudinal line of dense fine pubescence to 2 mm long, alternating position at each node, also with sparse, mostly simple hairs, upper stems densely and uniformly pubescent. *Stipules* 2–4 mm long, linear, inconspicuous, very finely pubescent, sometimes lacking (caducous?). *Leaves*: petioles 0.3–3.5 cm long, aculeate, villous, the blades 0.9–8.5 × 0.4–6 cm, the blades of lower leaves ovate or shallowly 3-lobed, the blades of upper leaves obovate, narrowly obovate or bract-like, vegetative branchlets in leaf axils well-developed, with up to 7 persistent leaves, the blades of leaves on vegetative branchlets ovate to obovate, blades of all leaves abaxially and adaxially with simple and stellate hairs on the veins, the base cuneate to truncate, the margin serrate to coarsely serrate (newly opened leaves exhibit a gland-like, thickened structure at the apex of each serration), the apex acute, the nectary present or absent. *Flowers* axillary, solitary, disposed in the upper 7–23 cm of the branch; peduncles 0.1–2 cm long, accrescent, articulating at the base or apparently unjointed, densely and finely stellate-pubescent and with dense, simple hairs to 2 mm long; involucellar bracteoles 6–7, 9–13 mm long, subulate, flattened, obscurely several-nerved, apex entire, with long simple hairs on margins; calyx 1.4–2.2 cm long, the lobes short- to long-acuminate, villous below, finely pubescent above, the nectary usually absent; corolla varying from white to several shades of off-white, yellow, and purple, with a small, purple centre, the petals 3–5.5 × 3–5.5 cm, obovate to broadly obovate, sparsely simple- or stellate-pubescent dorsally, glabrous ventrally; staminal column 20–40 mm long. *Capsule* 13–17 × 11–17 cm, broadly ovoid, densely appressed-pubescent, the beak absent or up to 1 mm long, glabrous; seeds 4 × 3 mm, subreniform, dark brown, faveolate and with short, white, many-branched hairs. Chromosome number, $2n = 36$.

Savanna and grassland, upper elevation forests, bamboo and *Hagenia* zones.

DISTRIBUTION. Mountains of East Africa (1300 to 2700 m) associated with the Rift Valley in Democratic Republic of Congo, Uganda, Rwanda, Tanzania, Kenya, and Ethiopia (distributional map and specimens cited in Wilson, 1983).

17. *Hibiscus sparseaculeatus* Baker f. in *J. Bot.* **76**: 22 (1938). Type: Somalia, Sheik Pass, *Freemantle* s.n. (BM!-holotype). Fig. 2H.

Cienfuegosia sp. Cufod. in Chiovenda, *Miss. biol. borana* **4**: 345, fig. 117 (1939).

Hibiscus greenwayi Cufod. in *Bull. Jard. Bot. État.* **29**: Suppl.: 562 (1959), non Baker f. (1937), pro parte quoad specim. *Bally* 9128.

Hibiscus greenwayi var. *megensis* J.P. Lebrun in *Adansonia* **15**: 379 (1976). Type: Kenya, Nyiro, 4000–5000 ft, stony hills, *Haylett* 12 (K-holotype).

Illustration: Cheek, *Fl. pl. afric.* **52**: pl. 2058 (1992).

Rigid, woody *shrub* to 3 m tall; stems with conspicuous, long (to 6 mm), red to brown, stout aculei, borne singly, in pairs, or in threes at the base of each node, stems otherwise glabrous and sometimes glaucous below. *Stipules* not seen. *Leaves* apparently shed early (some flowering and fruiting specimens are leafless); petioles 0.5–3 cm long, densely stellate-pubescent, the blades 0.6–2 × 2–4 cm, oval or rotund, densely stellate-pubescent abaxially and adaxially, the base truncate to cordate, the margin and apex dentate, the nectary 0.2–0.5 mm long. *Flowers* semi-pendulous, axillary, solitary; peduncles 0.5–3 cm long, articulating at or near the base, densely stellate-pubescent and sometimes with antrorse aculeoli; involucellar

bracteoles 7–9, 5–11 mm long, narrowly subulate, densely stellate-pubescent, the apex entire, pointed; calyx 1.2–2.0 cm long, the lobes lanceolate, short- to long-acuminate, densely stellate-pubescent and sparsely aculeolate, the nectary small but conspicuous; corolla yellow with a crimson-purple centre, the petals 4–6 × 3–5 cm, obovate, simple to stellate-pubescent dorsally, glabrous ventrally; staminal column 25–37 mm long, crimson, the filaments 0.5 mm long, the anthers red-brown, the mature pollen purple(?); style branches 9–12 mm long, red-brown below, purple(?) above, the stigmas purple. *Capsules* 10–20 × 9–15 mm, long appressed-pubescent, the beak 1–2 mm long, glabrous; seeds 4 × 3 mm, with fine pectinate scales, the funiculus with a dense fringe of short hairs.

Sandy or red soils, gravelly or rocky slopes, dry bushland dominated by *Acacia-Commiphora* and *Sansevieria* (Cheek, 1992), 750–2000 m elevation.

DISTRIBUTION. Fig. 4. Eastern Africa, from southern Ethiopia and Somalia to northern Tanzania. **Ethiopia**, Sidamo Prov., 8 miles S. of Mega on International Hwy., 25 December 1974, *Ash* 2783 (K); Km 10 SE Mega, 4 February 1973, *Boudet* 8166 (P); Borama, October 1945, *LePelley* in *Bally* 4663 (K). **Kenya**, Northern Province, Dandau, 14 June 1952, *Gillet* 13198 (BR, K-2 sheets); Northern Province, Furroli Mt., 15 September 1952, *Gillet* 13874 (B); K1, N. side of Lolockwe Mt., 28 km NNW of Archers post, 20 April 1973, *Gillet* 20199 (K). **Tanzania**, Northern Prov., Mbulu Dist., N. end Lake Eyasi, 23 July 1957, *Bally* 11588 (BR, G-2 sheets).

18. *Hibiscus greenwayi* Baker f. in *J. Bot.* **75**: 99 (1937). Type: Tanzania, NW Usambara, Mnazi, 12 January 1930, *Greenway* 2034 (EA-holotype; BM!-isotype). Fig. 2F.

Large, perennial, much-branched *shrub* to 3 m tall; stems almost glabrous below to densely and finely stellate-pubescent above and with few to many stout conical aculei. *Stipules* 4–6 mm long, filiform, with dense, fine, short hairs. *Leaves*: petioles 0.4–13 cm long, stellate-tomentose, the blades 2.5–8 × 0.9–11 cm, the blades of lower leaves palmately 5-lobed, the midlobe and lateral lobes rotund to spatulate, the outer lobes ovate to oval, the blades of upper leaves entire and oblanceolate or 3-lobed, all blades densely and finely stellate-pubescent abaxially and adaxially, the base cuneate, truncate, or cordate, the margin coarsely dentate or repand, the apex obtuse or acute, the nectary 0.5–1 mm long. *Flowers* pendulous, axillary, solitary and clustered near the apex; peduncles 0.3–0.9 cm long, articulating at the base, stellate-tomentose and sometimes with a few antrorse aculeoli; involucellar bracteoles 6–10, 8–14 mm long, subulate, sometimes slightly acuminate, with fine and dense simple hairs to stellate-tomentose, the apex entire, pointed, the base free; calyx 1.7–2.2 cm long, the lobes lanceolate, acuminate, densely and finely stellate-pubescent and with a few antrorse aculeoli on the ribs, nectary small but conspicuous; corolla funnelform, lemon yellow to primrose yellow, with a red-purple centre, the petals 4–8.5 × 3–6.5 cm, obovate to oval, sparsely and finely to coarsely stellate-pubescent dorsally, glabrous ventrally; staminal column 35–60 mm long, dark pink to red-purple, the filaments 0.5–1 mm long, the anthers red to purple, the pollen yellow, orange-tan, or purple; style branches included in the staminal column or up to 9 mm long, red or purple, the stigmas dark red-purple. *Capsules* 16–18 × 11–14 mm, densely appressed-pubescent, the beak 1–2 mm long, glabrous; seeds 5–6 × 3–4 mm, subreniform, dark brown, faveolate and with long (0.5 mm) simple, flattened tan/brown hairs, the funiculus densely covered with simple, flattened straw-coloured hairs. Chromosome number, $n = 18$.

Ditch banks with grasses and shrubs, dry savannas, dense *Acacia-Commiphora* thornbush, edge of *Brachystegia* woodlands.

DISTRIBUTION. **Fig. 4.** Uganda, Kenya, and Tanzania. **Uganda**, about the Griffen Falls (Mabira Forest), 18 February 1918, *Dümmer* 3908 (BM). **Kenya**, Kwale Dist., between Samburu and MacKinnon Road, 31 August 1953, *Drummond & Hemsley* 4078 (K); Taita Dist., Tsavo West, hill c. 4 km SE of Manda Hill, 24 July 1969, *Gilbert* 4073 (EA); K7, Kilifi Dist., outside Sala Gate, 59 km W. of Malindi, 28 February 1977, *Hooper & Townsend* 1094 (K-2 sheets); Voi Dist., foot of Taita Hills, Bura, 14 April 1969, *Jones* 69159 (NA); K4, Kitui Dist., Yakaseva, Voo location, 24 August 1968, *Kimani* 78 (EA); K4, Kitui Dist., Mutomo, 24 April 1969, *Napper & Kanuri* 2070 (B, EA); Kilifi Dist., Marafa, 25 miles NW of Malindi, 22 November 1961, *Polhill & Paulo* 835 (B, BR); Kwale Dist., MacKinnon Rd., c. 54 miles from Mombasa, 12 June 1964, *Verdcourt* 3904 (EA, K); Kwale Dist., 8 km E. of MacKinnon Rd on Nairobi-Mombasa Hwy (A-109), 12 August 1975, *Wilson* 75140 (ASU, EA, NA); Kwale Dist., 30 km W. of Mombasa on Nairobi-Mombasa Hwy (A-109), 13 August 1975, *Wilson* 75143 (ASU, EA, NA). **Tanzania**, Umba Steppe, plains at base of Usambara Mts, 3 February 1954, *Faulkner* 1339 (B, K); T3, N. of Mombo, 8 September 1972, *Flock* 431 (EA).

19. *Hibiscus partitus* (Hochr.) F.D. Wilson, **comb. et stat. nov.**

Hibiscus diversifolius var. *partitus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 120 (1900). Type: Madagascar, environ de Tananarive, *Goudot* s.n. (G).

Illustration: Hochreutiner, *Fl. Madagasc., Malvac.*: 37, fig. X, 9, 10 (1955).

Habit unknown; stems large, stout-aculeate and with lines of stellate pubescence below, more densely stellate-pubescent above. *Stipules* 4–5 mm long, filiform to linear, finely short-pubescent. *Leaves*: petioles 0.3–5 cm long, aculeolate abaxially and with a line of dense pubescence adaxially, the blades 1.3–5 × 0.2–6 cm, on lower leaves palmately 5-lobed and manifestly secondarily lobed, on upper leaves bract-like or 5-lobed and secondarily lobed, all blades abaxially aculeolate on the ribs, veins, and margins, plus some dense, fine simple to stellate hairs, adaxially with simple to stellate hairs, usually not as dense, the base cuneate to truncate, the margin entire, serrate, or coarsely serrate and secondarily lobed, the apex acute to acuminate, the nectary minute (< 0.5 mm long) but conspicuous. *Flowers* axillary, solitary; peduncles 0.3–0.9 cm long, articulating at the base, antrorse-aculeolate and finely stellate-tomentose; involucellar bracteoles 7–8, 7–11 mm long, linear to narrowly subulate, with 2-fid or stellate hairs or short bristles, the apex entire, the base free or scarcely united; calyx 1.2–2.1 cm long, the lobes lanceolate to narrowly ovate, slightly to long-acuminate, aculeolate on the ribs and with short, rigid bristles, more dense near the base, the nectary small (0.2 mm long) but conspicuous; corolla yellow(?), with a large purple(?) centre, the petals 4–5.5 × 2.5–3.5 cm, obovate, with sparse 2–4-fid hairs dorsally, glabrous(?) ventrally. *Capsules* 14–20 × 12–15 mm, densely appressed-pubescent, the beak 1 mm long, glabrous; seeds unknown.

Rocky habitats and dried-out ponds (Hochreutiner, 1955).

DISTRIBUTION. **Fig. 5.** Central and northern Madagascar. **Madagascar**, Central, without precise locality and date, *Baron* 542, 3286, 3945 (K); North-west, without precise locality and date, *Baron* 5347 (K). Hochreutiner (1955) cites several specimens from west-central Madagascar.

20. *Hibiscus diversifolius* Jacq., *Collectanea* 2: 307 (1789). Type: *Icon. pl. rar.*: t. 551 (1792) (neotype, Fryxell, 1988). This was recognized as the holotype by Borssum Waalkes (1966), but as Fryxell (1988) points out, the plate was published several years after the name was published.

Perennial *subshrub* or *shrub* to 3 m tall (or rarely a *tree* to 10 m tall), the stems below with many stout conical aculei and with one or more

lines of pubescence, or more densely stellate-pubescent, the stems above aculeolate, densely and finely simple- and stellate-pubescent. *Stipules* 3–7 mm long, linear, pubescent. *Leaves*: petioles 0.6–22 cm long, with pubescence like that of the upper stems, the blades 3–16 × 0.7–14 cm, the blades of lower leaves ovate to shallowly or very deeply palmately 3–7-lobed, the blades of uppermost leaves bract-like, linear or narrowly lanceolate, all blades abaxially with simple and stellate hairs on the ribs and veins and adaxially with simple and stellate hairs on the ribs, and simple and 2-fid hairs on the margins, the base cuneate, truncate, or cordate, the margin serrate, dentate, or crenate, the apex acute or obtuse, the nectary 1–2 mm long, conspicuous, on the midrib and sometimes on two lateral ribs. *Flowers* axillary, solitary, or with 1–3 flowers at each node, or borne in racemes formed by the reduction of the upper leaves and shortening of the internodes; peduncles 0.2–0.8 cm long, articulating at the base, densely stellate-pubescent and with or without long, simple bristles; involucellar bracteoles 5–10, 8–15 mm long, linear to subulate, slightly concave ventrally, bristly, the apex entire, the base free; calyx 2–3 cm long, the lobes lanceolate, acute to short-acuminate, covered with stiff bristles, the nectary conspicuous; corolla light yellow, reddish, or purple, with a dark red-purple centre, the petals 3–6 × 2–5 cm, obovate, sparsely simple- and stellate-pubescent dorsally, glabrous ventrally; staminal column 15–32 mm long, white, pink, red, or purple, the filaments 1–2 mm long, dark red-purple, the anthers light pink, red, or purple, the pollen orange; style branches included in the staminal column or to 7 mm long, dark pink to purple; stigmas dark red-purple. *Capsules* 20–24 × 15–19 mm, densely appressed-pubescent, the beak 2 mm long, glabrous; seeds 4 × 3 mm, subreniform, dark brown, glabrous, with parallel striations, the funiculus tan, conspicuous, glabrous. Chromosome number, $n = 72$.

A form from Uganda, *Synge* S.1042 (BM), is closely allied to *Hibiscus diversifolius*, but has foliaceous involucellar bracteoles and may be an undescribed species.

20a. *Hibiscus diversifolius* Jacq. subsp. ***diversifolius***

Hibiscus ficulneus Cav., *Diss.* 3: 148, t. 51, fig. 2 (1787), non L. (1753), nom. illeg. (Art. 53.1).

Hibiscus scaber Lam., *Encycl.* 3: 350 (1792). Type: Mauritius (Île de France), *Commerson* s.n. (P-LA-holotype).

?*Hibiscus biflorus* A. Spreng., *Tent. suppl.*: 19 (1828). Type: South Africa, *Zeyher* 241 (BM!-sketch of type).

Hibiscus macularis E. Mey. ex Harv. in Harv. & Sond., *Fl. cap.* 1: 171 (1860), nom. nud.

Hibiscus decaisneanus Schimp. ex Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 119 (1900), nom. nud. Type: Ethiopia, Tigrè v. Begemder, 10 November 1863, *Schimper* 1479 (BM!-isotype?).

Hibiscus diversifolius subsp. *genuinus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 119 (1900), nom. illeg. (Art. 26.2).

Hibiscus paludosus Merr. in *Philipp. J. Sci.* 3: 151 (1908). Type: The Philippines, Mindanao, Lake Lanao, *Clemens & Clemens* s.n. (BO, G, L-isotypes).

Hibiscus berberidifolius Cufod. in *Bull. Jard. Bot. État.* 29, *Suppl.*: 560 (1959), non A. Rich. (1847).

Hibiscus diversifolius var. *witteanus* Cufod. in *Bull. Jard. Bot. État.* 29, *Suppl.*: 560 (1959), non Hochr. (1947).

Hibiscus diversifolius var. *angustilobus* Hauman in *Bull. Jard. Bot. État.* 31: 86 (1961) excl. specs. *Laurent* 11, *de Witte* 2435. Type: Democratic Republic of Congo (Zaire), Haut-Katanga: Sakala, Marungu, April 1944, *Dubois* 1157 (BR!-holotype).

Illustrations: Maquet, *Fl. rwand.* 2: 383, fig. 121, 4 (1983); An-

draws, *Fl. pl. anglo-egypt. sud.* 2: 24, fig. 10 (1952); Hochreutiner, *Fl. Madagascar.*, *Malvac.* 39, fig. X, 6–8 (1955).

Stems usually with one or more longitudinal lines of pubescence, flowers yellow (Exell, 1961).

In generally moist habitats, riverbeds, river banks, swamps, in papyrus and other vegetation at lake edges, bays; also reported as ruderal plants on road shoulders and in grass and bushland.

DISTRIBUTION. **Fig. 4.** Circumtropical. Widely distributed in subsaharan Africa from Cameroon and Ethiopia to Madagascar and South Africa, except in the *Flora Zambesiaca* area (Zambia, Malawi, Zimbabwe, Mozambique, Botswana), where it is replaced by subsp. *rivularis* (Exell, 1961). *Wilson & Kissie* 7531 (subsp. *rivularis*) and 7532 (subsp. *diversifolius*) were growing together in a papyrus-*Typha* swamp in the Musoma Region, Tanzania (Wilson, 1978); disjunct in Senegal? **Senegal**, Niombato, 1950–51, *Berhaut* 1061 (BR, P). **Cameroon**, près village de Pêcheurs de Mouhengué (=Malimba), 6 January 1974, *Letouzey* 12629 (P); Ndop Plain, 6 March 1962, *Brunt* 146 (K-2 sheets). **Ethiopia**, Shoa Prov., Lake Shala, 14 November 1971, *Ash* 1357 (K); Agaro, 24 January 1969, *Jones* 6908 (K). **Congo**, Region de Brazzaville, île M'Bamou, 13 October 1967, *Sita* 1818 (P); **Democratic Republic of Congo**, Plaine de la Ruzizi, lac Ranyinia, January 1950, *Germain* 5650 (G); Kivu Prov., Kabare Territ., Lulonga, 9 January 1967, *Vermeylen* 35 (BR). **Uganda**, Kyaka, Toro, 1914, *Snowden* 31 (BM, K). **Kenya**, 13 miles S. of Thika on Nairobi-Thika Road (Hwy A-2), 17 July 1975, *Wilson* 7511 (ASU, EA, NA); c. 9 km from Nairobi on road to Nakuru, 24 June 1977, *Gachathi* 287 (B); Nairobi Prov., Kiririchusa Ndogo Valley, 10 July 1944, *Bally* 3407 (G). **St. Helena**, above Lufkins, 23 February 1955, *Kerr* 108 (BM). **Rwanda**, 22 August 1958, *Michel* 5562 (BR). **Tanzania**, Musoma Region, 8 km N. of Nyakanga on Hwy B-6, 23 July 1975, *Wilson & Kissie* 7532 (ASU, EA, NA); Laliondo Dist., 6 July 1956, *Williams* 702 (BR); Kirumba, Illemera, Mwanza, 24 June 1953, *Tanner* 1608 (K); Ndingo, Songea Dist., 29 September 1956, *Semsei* 2490 (K). **Malawi**, Station Kyimbila, 29 September 1910, *Stolz* 307 (G); N. Prov., Mzimba Dist., Vipya Plateau, 14 July 1975, *Pawek* 9887 (K). **Madagascar**, Nord Betsiléo, Linabé, August 1880, *Hildebrandt* 3567 (BM, G); central Madagascar, 1855, *Baron* 4169 (BM). **South Africa**, Natal, Alexandra Dist., Dumisa, 12 May 1908, *Rudatis* 380 (BM); Cape Peninsula, Retreat, April 1951, *Pillans* 10565 (G); Cape Prov., Voëklip camping area, 29 August 1985, *Williams* 1087 (PRE); Cape Prov., Humansdorp, November 1921, *Fourcade* 1781 (BOL); Cape Peninsula, Granger Kloof swamp below farm, 9 May 1897, *Wolley* 2496 (BM, BOL). **Mauritius**, Rivière Citron near Balacava, 21 November 1961, *Duljeet* 10244 (BM).

Hulstaert 1472 (BR!), listed under *Hibiscus diversifolius* var. *angustilobus* by Hauman (1963) is probably a hybrid involving *H. diversifolius* (*H. cannabinus* × *diversifolius*?), as Hauman's annotation of the specimen indicated.

20b. *Hibiscus diversifolius* subsp. *rivularis* (Bremek. & Oberm.) Exell, *Fl. zambes.* 1: 444 (1961).

Hibiscus rivularis Bremek. & Oberm. in *Ann. Transvaal Mus.* 16(3): 424 (1935). Type: Botswana, Chobe R., Kabulabula, July 1930, *van Son* s.n., in Herb. Transv. Mus. 28936 (PRE-holotype; BM!-isotype).

Stems more densely and uniformly hairy, flowers reddish to purple (Exell, 1961).

Generally in habitats in or close to standing water, riverbanks, swamps, lake shores, forest edges.

DISTRIBUTION. **Fig. 4.** Eastern, southeastern and southwestern Africa from Uganda to Botswana. **Angola**, Cuanza Sul, banks of River Longo, Quissama Country, 7 June 1921, *Gossweiler* 8300 (BM, P) [Exell & Mendonça (1937) cite *Gossweiler* 8300 as subsp. *diversifolius* – note on BM specimen says 'flower a beautiful dusky purple']. **Democratic Republic of Congo**, Lac Mokoto, Terr. Masisi, 22 January 1959, *Leonard* 2657 (BR). **Rwanda**, Territ. Biumba, Reg. du Mutara, env. de Mimuli, 2 April 1957, *Troupin* 3079 (BR).

Burundi, Kigamba (préf. Ruyigi), 3 October 1974, *Auquier* 4367 (BR). **Uganda**, Koki, 9 August 1903, *Bagshawe* 380 (BM); Igara, Ankole, March 1939, *Purseglove* 612 (BR, K-2 sheets). **Tanzania**, West Lake Province, Keza, Bushubi, Ngara, 30 May 1960, *Tanner* 4950 (K); Bezirk Lindi, Lutamba-See, 40 km W. Lindi, 9 November 1934, *Schlieben* 5287 (BM, G); Musoma Reg., 8 km N. of Nyakanga on Hwy B-6, 23 July 1975, *Wilson & Kissie* 7531 (ASU, EA, NA); Zanzibar, June 1894, *Sacleux* 2148 (P). **Zambia**, Western Prov., Fort Rosebery Dist., 20 August 1952, *Angus* 353 (BM, BR); near Nabwalya's, Luangwa Valley, 16 August 1966, *Asile* 4932 (K). **Malawi**, Benga by Lake Nyasa, 28 August 1950, *Foster* 11 (K); Kota-Kota Dist., Benga, W. shore of Lake Nyasa, 2 September 1946, *Brass* 17480 (BR); Chipoka, Fort Johnston, 7 August 1954, *Banda* 41 (BM). **Mozambique**, Gaza, Bilene, Praia de S. Martinho, 7 November 1969, *Correia & Marques* 1450 (K); Sul do Save, Lourenço Marques, Catembe, 10 June 1957, *de Carvalho* 277 (BM); Delagoa Bay, Rikatta, 1890, *Junod* 38 (G-2 sheets); Lourenço Marques, Marracuene, 30 June 1971, *Marques* 2313 (NBG); Kurumadgi R. Jihu, 12 August 1906, *Swynnerton* 2109 (BM). **Botswana**, N. District, Linyanti R. at Shalie, 28 October 1972, *Gibbs Russell* 2413 (PRE); banks of Chobe R., 8 miles N. of Kachikau, 9 July 1937, *Erens* 366 (BR).

21. *Hibiscus reekmansii* F.D. Wilson, sp. nov. Type: Burundi, Muramwya Prov., bois sacré de Mptosa jachère bord route, 17 May 1979, *Reekmans* 7993 (BR!-holotype).

Fig. 2D.

Hibiscus diversifolius var. *angustilobus* Hauman in *Bull. Jard. Bot. État* 31: 86 (1961), pro parte quoad specims. *Laurent* 11, *de Witte* 2435.

Hibiscus diversifolius var. *angustilobus* P. Maquet in G. Troupin (Ed.), *Fl. rwanda* 2: 382 (1983), non Hauman (1961), pro parte quoad specims. *Auquier* 3937, *Troupin* 16264.

Caules aculeati; folia profunde 5–7 lobata; pedunculi fructificantes, <1 cm longi; bracteolae involucellorum non bifurcatae, apicibus auctis; calyces pilis argenteis vel cinereis vel stramineis, nectariis in quoque costa.

Shrub to 2 m tall; stems with antrorse to retrorse aculeoli and with lines of stellate pubescence below, densely stellate-pubescent above. *Stipules* 2–6 mm long, filiform or linear, with fine, short hairs. *Leaves*: petioles 0.4–5 cm long, with pubescence like that of the stem, the blades 0.6–6 × 0.2–7 cm, the blades of lower leaves deeply 5(–7)-lobed, the midlobe linear to ovate or obovate, the lateral lobes linear to ovate, the outer lobes lanceolate or triangular, the midlobe and lateral lobes often secondarily lobed, the blades of upper leaves bract-like or 3-lobed, all blades abaxially aculeolate and with simple and stellate hairs on the ribs, and simple to 4-fid hairs on the veins, adaxially with dense simple to stellate hairs on the ribs and fine, short, mostly stellate hairs on the veins, the base cuneate, truncate, or cordate, the margin serrate to irregularly serrate, the apex acute or acuminate, the nectary 0.2–0.5 mm long. *Flowers* axillary, solitary, or with 2–3 nodes clustered near the apex, some flowers with a subtending bract resembling the stipules, linear, flattened, pink, sometimes with a bifid apex; peduncles 0.2–0.6 cm long, articulating at the base, with simple, appressed grey-to straw-coloured, dense, fine hairs to 2 mm long; involucellar bracteoles 6–8, 6–10 mm long, linear, flattened, with short bristles or with hairs like those of the peduncles, the apex entire but slightly enlarged, the base free; calyx 1.0–1.5 cm long, the lobes triangular-acute to lanceolate-acuminate, with bristles to 3 mm long or with hairs as on the peduncles, the nectary small but conspicuous; corolla bright yellow to primrose yellow, with a small purple centre, the petals 3–4 × 2–2.5 cm, obovate, finely stellate-pubescent dorsally, glabrous ventrally; staminal column 16 mm long, yellow(?), the filaments 0.5 mm long, the anthers yellow-brown(?), the pollen yellow; style branches 5 mm long, yellow-brown(?). *Capsule* 12–15 × 10–13 mm, densely

appressed-pubescent, the beak 1–2 mm long, glabrous; seeds 3 × 2 mm, subreniform, dark brown, with a faveolate background and minute protuberances, the funiculus small, dark-brown, glabrous.

Mountainous habitats, 1800–2400 m elevation, in savannas, rock talus, fields, and pastures.

DISTRIBUTION. **Fig. 5.** Eastern Democratic Republic of Congo, Rwanda, Burundi, and western Tanzania. **Democratic Republic of Congo**, Kivu, environs de Kabare, 25 July 1942, *Laurent* 11 (BR); Parc Nat. de L'Upemba, Mukana, 24 March 1942, *de Witte* 2435 (BR). **Rwanda**, route Butare-Cyangugu, vers km 30, Préf. Gikongoro, 28 May 1981, *Troupin* 16264 (BR); Colline Gisego, village Rugera, au sud de lat Préf. Gikongoro, 6 September 1974, *Auquier* 3937 (BR). **Burundi**, Muramvya Prov., Teza, 19 June 1980, *Reekmans* 9395 (BR). **Tanzania**, Iringa Prov., Mbosi, May 1935, *Horsburgh-Porter* s.n. (BM).

22. *Hibiscus sabdariffa* L., *Sp. pl.* 2: 695 (1753). Type: resolved but not yet published (P.A. Fryxell, pers. comm., 1996).

Hibiscus cannabinus Hiern, *Cat. afr. pl.* 1: 72 (1896), non L. (1759), pro parte quoad specims. *Welwitsch* 5263 (BM!, LISU!), *Welwitsch* 5265 (BM!, LISU!).

Hibiscus masuianus de Wild. & T. Durand in *Bull. Soc. Roy. Bot. Belgique* 38(2): 20 (1899). Type: Democratic Republic of Congo (Zaire), Boma, 1 August 1895, *Dewèvre* 71 (BR!-holotype & isotype).

Hibiscus sabdariffa var. *albus* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 32 (1911).

Hibiscus sabdariffa var. *intermedius* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 32 (1911).

Hibiscus sabdariffa var. *ruber* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 32 (1911).

Hibiscus sabdariffa var. *bhaghalpuriensis* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 33 (1911).

Hibiscus sabdariffa var. *altissima* Wester in *Philipp. Agric. Rev.* 7: 266 (1914).

For additional synonymy, see Hochreutiner, 1900: 116, 117; Hauman, 1963: 114; Borssum Waalkes, 1966: 64; Fryxell, 1988: 225.

Illustrations: Andrews, *Fl. pl. anglo-egypt. sud.* 2: 24, fig. 12 (1952); Hochreutiner, *Fl. Madagasc., Malvac.*: 39, fig. XI, 3 (1955); Ochse, *Veg. Dutch E. Ind.*: 476, fig. 296 (1960).

Annual *herb*, branched or unbranched, up to 4.5 m tall; stems and foliage green, green-red, or red, glabrous to sparsely pubescent, sometimes sparsely aculeate. *Stipules* 5–13 mm long, linear to narrowly subulate. *Leaves*: petioles 0.3–12 cm long, pubescence like that of the stems, the blades 2–15 × 2–15 cm, blades on lower leaves almost entire to shallowly or deeply 3–5(–7)-lobed, on upper leaves almost entire to shallowly to deeply 3–5-lobed, the middle lobe longest, at the plant apex narrowly lanceolate to bract-like, all blades almost glabrous or abaxially and adaxially with mostly simple hairs, and abaxially with a few aculei on the ribs, the base cuneate to truncate, the margin finely to coarsely serrate, the apex obtuse to acute or acuminate, the nectary 1–3 mm long, slit-like. *Flowers* axillary, solitary; peduncles 0.6–2.0 cm long, articulating near the base to halfway between the base and the epicalyx, glabrous to finely pubescent below the articulation, and almost glabrous to bristly or sometimes aculeolate above the articulation; involuellar bracteoles 8–12, united at the base, the free part 6–18 mm long, the upper 3–6 mm channelled on the ventral surface, flattened, subulate to triangular, short-aculeolate, the apex entire, pointed; calyx 1.1–5(–5.5) cm long, green, green-red, or red, fleshy and edible, or leathery and inedible, the lobes triangular to ovate, acute to acuminate, glabrous, sparsely pubescent or bristly, the nectary inconspicuous; corolla

pale yellow, with or without a dark red-purple centre, the petals 2–5 × 1.2–3.5 cm, obovate, glabrous to simple or stellate-pubescent dorsally, glabrous ventrally; staminal column 10–20 mm long, pink, filaments 1 mm long, pollen tan; style branches included in the staminal column; stigmas dark red-purple. *Capsules* 13–22 × 11–20 mm, ovoid, nearly glabrous to sparsely or densely appressed-pubescent; seeds 3–5 × 2–4 mm, subreniform, dark brown, faveolate, with or without minute pectinate or stellate scales, the funiculus small, dark brown, glabrous. Chromosome number, *n* = 36.

Widely cultivated in tropical and subtropical areas of the world, including northern Africa; sometimes escapes from cultivation (e.g. Karnataka, India, Saldanha, 1985).

The most common form of *Hibiscus sabdariffa* in Africa is a culinary form with fleshy edible calyces (segregated as *H. sabdariffa* var. *sabdariffa* by Rakshit & Kundu, 1970: 163). The calyces have various uses, including drinks and jams. The leaves also are eaten sometimes as a vegetable (Exell, 1961; Ochse, 1960). On a collection from Darfur Province, Sudan, *Lynes* 538 (BM), it was noted that the plant was used to preserve and water-proof skins, but it did not specify which part of the plant was used, or how it was used. Several cultivars have been released (e.g. Abdallah *et al.*, 1976). In fact, the varieties of Howard & Howard (1911) and of Wester (1914) represent horticultural cultivars rather than botanical varieties. The culinary form is found mostly in cultivation but sometimes becomes naturalized. A short description follows: Branched, branches long, plant up to 1.5 m tall; stems almost glabrous; involuellar bracteoles up to 18 mm long; calyx 3(–5) cm long in fruit, fleshy and edible, glabrous or sparsely pubescent; petals up to 5 × 3 cm.

DISTRIBUTION (in subsaharan Africa and Asia). **Senegal**, Parc Nat. de lat Basse Casamance, 26 November 1984, *Bamps* 7785 (BR). **Mali**, Madina Diassa, 19 November 1974, *Audru* 5928 (P). **Upper Volta**, W. Dindresso, 14 November 1980, *Lejoly* 80/129 (BR). **Sierra Leone**, Njala, 19 November 1930, *Deighton* 1849 (K). **Guinea-Bissau**, Bedanda-Cadique, 5 January 1962, *Pereira* 2613 (G-2 sheets). **Togo**, Lomi (Nord), 5 November 1985, *Schilter* 112 (G). **Nigeria**, North-east State, Gombe Dist., near Gombe Railway Station, 19 October 1971, *Latilo* FHI 63844 (K). **Central African Republic**, 6 km SE of Bambari on the Alindao road, 14 November 1981, *Fay* 1955 (K). **Cameroon**, Mogodé, Gomtemale Mt., 9 October 1972, *Leeuwenberg & v. Beek* 10474 (BR). **Sudan**, Tombouctou, 18 July 1899, *Chevalier* 1250 (BR). **Democratic Republic of Congo**, Leopoldville, 17 April 1915, *Bequaert* 7410 (BR). **Uganda**, without specific locality, June 1917, *Dümmer* 3194 (BM). **Burundi**, Bujumbura Prov., Katumba Commune, 15 April 1977, *Reekmans* 6021 (BR). **Tanzania**, West Lake Prov., Ruganzo, Bugufi, Ngara, 10 July 1960, *Tanner* 5033 (K). **Angola**, Lunda, 11 May 1903, *Gossweiler* 1477 (BM). **Zambia**, Balovale Dist., July 1933, *Trapnell* 1262 (K). **Malawi**, Rifu Village, 13 July 1936, *Burt* 6088 (BM). **Mozambique**, Montepuez, Aldeamento de Nairó, 27 August 1972, *Mafumo* 19 (BR). **Madagascar**, Vallée de la Betsiboka, 5–6 July 1928, *Humbert & Swingle* 4412 (B). **Namibia**, Okahamoja, September 1934, *Vedder* 7826 (B); Righini Terr., Lovanium, 7 April 1961, *Evrard* 6290 (BR). **India**, Tilakani, Gangpur State, Orissa, 14 November 1947, *Mooney* 2970 (K); Gdukki Dist., 15 December 1982, *Mohanan* (Bot. Surv. Ind. 76099) (CAL). **Nepal**, East Nepal, Nissim-Dunham, 30 October 1963, *Hara et al.* (Univ. Tokyo 6300743) (BM). **Burma**, Taungdut, Chindwin River, 28 March 1935, *Kingdon-Ward* 11277 (BM). **Thailand**, Bangkok, 16 November 1924, *Marcant* 1899 (BM). **The Philippines**, Manila, 17 December 1903, *Merrill* 3801 (BM).

A short description follows of the fibre type of *Hibiscus sabdariffa* cv. 'altissima' (segregated as *H. sabdariffa* var. *altissima* Wester by Rakshit & Kundu, 1970): Unbranched or branches short, plant up to 4.5 m tall; stems aculeolate or pubescent; involuellar bracteoles up to 7 mm long; calyx up to 2.2 cm long in fruit, leathery, inedible, bristly; petals up to 3 × 2 cm.

This form is not found commonly in Africa. *Morton & Jarr* 3250 from Sierra Leone is a tall, erect and unbranched cultivated plant, but

it is not clear from the label whether it is cultivated for fibre (could be cultivated for leaves or seed). According to Dempsey (1975: 306) the fibre type is grown as a fibre crop on a large scale in the Central African Republic and in seven countries in south-central and south-eastern Asia.

DISTRIBUTION. **Sierra Leone**, Kain Kordu, near Lagbwema, Lono Dist., 12 December 1965, *Morton & Jarr* SL 3250 (K). **India**, Carnatic, 10 km from Ulundurpet on the Salem road, 13 December 1978, *Mathew & Perumal* RHT 20145 (CAL). **Indonesia** (Java), *Zollinger* 2998 (BM).

Forms occur in Africa that are neither the edible, culinary form nor the fibre form; they are usually branched and have bristly and/or aculeate plant parts. Some may be cultivated for seeds (Wilson & Menzel, 1964) but some appear to be truly wild or at least ruderal. For example, the seeds which gave rise to *Menzel & Wilson* HV220 (FSU) were collected originally in the wild near Maradi, Niger by D.W. Fishler. This plant is apparently truly wild because it is branched and woody, has aculeate stems, bristly calyces, and small seeds.

DISTRIBUTION. **Niger**, provenance Maradi, grown in cultivation in U.S.A., Florida, Palm Beach Co., Everglades Exp. Stn., 12 December 1964, *Menzel & Wilson* HV220 (FSU). **Ghana**, mile 73, Arebubi-Yeji road, grass savannah, 13 December 1955, *Afruah* (WACRI Herb. 5097) (K); Danongo, Gonja Dev. Corp. farm, ruderal, 30 September 1956, *Innes* GC 30194 (K); N. of Pong-Tamale, in cultivated land, 12 December 1953, *Morton* GC 9870 (K). **Nigeria**, Plateau Prov., Jemaa Emirate, about 8 miles E. of Jagindi, Madaki Dist., open savannah woodland just W. of Kurmin Damiss, 19 November 1946, *Keay & Onochie* (FHI 212724) (K); **Angola**, Golungo Alto, May 1855, *Welwitsch* 5263 (BM); Quicuxe(?) , July 1854, *Welwitsch* 5265 (BM).

23. *Hibiscus cannabinus* L., *Syst. nat.* 10th ed.: 1149 (1759). Type: resolved but not yet published (P.A. Fryxell, pers. comm., 1996).

Hibiscus sabdariffa var. δ L., *Sp. pl.* 2: 695 (1753).

?*Hibiscus verrucosus* Guill. & Perr., *Fl. Seneg. tent.* 1: 57 (1831).

?*Hibiscus cannabinus* var. *verrucosus* (Guill. & Perr.) Garcke in *Linnaea* 43: 56 (1880).

Hibiscus cannabinus var. *genuinus* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 115 (1900), nom illeg. (Art. 26.2).

Hibiscus cannabinus var. *simplex* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 16 (1911).

Hibiscus cannabinus var. *purpureus* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 17 (1911).

Hibiscus cannabinus var. *ruber* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 17 (1911).

Hibiscus cannabinus var. *viridis* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 17 (1911).

Hibiscus cannabinus var. *vulgaris* A. & G. Howard in *Mem. Dept. Agric. India, Bot. Ser.* 4: 17 (1911).

Hibiscus sabdariffa subsp. *cannabinus* (L.) G. Panigrahi & S.K. Murti, *Fl. Bilaspur dist.* 1: 127 (1989).

For additional synonymy, see Exell, 1961. Hochreutiner (1900: 114–115) lists an extensive synonymy for *Hibiscus cannabinus*, most of which I have not been able to check. Hochreutiner and other authors generally have treated *H. verrucosus* as a synonym of *H. cannabinus*, but it may well be synonymous with *H. asper* (in which case, the correct name for this entity is *H. verrucosus*). In the absence of an authentic type specimen of *H. verrucosus*, this question must go unanswered. Some of Hochreutiner's synonyms obviously refer to other species, as follows: *H. radiatus* Cav., *H. unidens* Lindl. (= *H. radiatus* Cav.), *H. lindleyi* Wall. (= *H. radiatus* Cav.), *H. asper* Hook. f., *H. mechowii* Garcke, *H. acetosella* Welw. ex Hiern.

Illustrations: *Icones Roxburghianae* no. 355 (K); Verdoorn & Collett, *Farming South Africa* 34: 1, fig. 1 (1947); Andrews, *Fl. pl. anglo-egypt. sud.* 2: 24, fig. 11 (1952); Hochreutiner, *Fl. Madagasc., Malvac.* 37, fig. X, 4, 5 (1955); Gibson, *Wild fl. natal:* pl. 65, fig. 3 (1975).

Annual *herb* up to 2 m tall (up to 5 m tall in cultivars), stems pale green to pink or red-purple, sparsely aculeate, otherwise nearly glabrous. *Stipules* 4–7 mm long, filiform. *Leaves:* petioles 0.4–30 cm long, aculeate like the stems, the blades 1–19 × 0.1–20 cm, very shallowly to very deeply palmately 3–7-lobed below, sometimes unlobed above, or even bract-like near the apex, nearly glabrous, sparsely aculeolate on the ribs, the base cuneate to shallowly cordate, the margin serrate or dentate, the apex acute, the nectary 3 mm long, prominent. *Flowers* axillary, solitary, or sometimes clustered near the apex; peduncles 0.3–0.6 cm long, articulating at the base, aculeolate or bristly; involucellar bracteoles 7–8, 7–18 mm long, linear to subulate, aculeolate or bristly, the apex entire, the base free; calyx 1.1–2.5 cm long (up to 3.4 cm in cultivars), the lobes acuminate to subcaudate, aculeate, or sparsely to densely bristly, with a characteristic white, woolly tomentum, especially near the base and margins, the nectary conspicuous; corolla off-white, cream, or various shades of purple, from almost grey to deep purple, and with a deep purple centre, the petals 4–6 × 3–5 cm, obovate, sparsely stellate-pubescent dorsally, glabrous ventrally; staminal column 17–23 mm long, dark red, the filaments 1–2 mm long, the anthers tan, the pollen yellow; style branches 2–4 mm long, dark red; stigmas dark red. *Capsule* 12–20 × 11–15 mm, ovoid-acuminate, densely-appressed pubescent, the beak 1 mm long, glabrous; seeds 3–4 × 2–3 mm, subreniform, dark brown, faveolate, and sometimes with minute pectinate scales, the funiculus small, tan, glabrous. Chromosome number, $n = 18$.

Cultivated, ruderal, and wild, in cultivated land, old gardens, dikes between irrigated fields, ridge tops in shallow soil, rocky fissures, talus, open grassland plains, savannas, flood plains, seasonal swamps.

DISTRIBUTION. **Fig. 4.** Widely distributed as a cultivated fibre, food and medicinal plant and as a ruderal and native plant in subsarhan Africa; grown by Makrakra Tribe in Sudan for game nets, *Cartwright* 2 (K); seeds eaten by natives in Sudan, *Imperial Institute* s.n. (K); used medicinally in Nigeria for stomach complaint, *Wickens* 3546 (K). It is cultivated as a fibre crop and sometimes naturalized in India (Saldhana, 1985), and cultivated as a fibre and paper-pulp plant in a number of other tropical and subtropical countries (Dempsey, 1975; Taylor, 1992). The following listing includes only collections from native habitats. **Senegal**, 1952, *Berhaut* 263 (P). **Mali**, near Kidal, 25 October 1968, *Popov* 11 (BM). **Ghana**, along Comtomenlō-Achimota Rd, Accra E. P., 18 August 1955, *Lovi* (WACRI Herb. 4200) (K). **Nigeria**, NE State, Kirinava, 9 December 1975, *Wickens* 3546 (K). **Cameroon**, Waza, 21 November 1969, *Hepper* 3957 (K); près Yafounou (50 km ENE de Meiganga), 17 October 1963, *Letouzey* 6200 (P); Mogodé, Gomtemale Mt., 9 October 1972, *Leeuwenberg* 10473 (BR). **Chad**, c. 8 km S. of Ft. Lamy, along road to Bongor, 3 January 1965, *deWilde & deWilde-Duyffes* 5175 (BR). **Central African Republic**, Manova-Gounda, St. Floris Nat. Park, 2 October 1982, *Fay* 3683 (K). **Sudan**, Equatorial Prov., 6 miles S. of Gogrial, without date, *Myers* 7692 (K); Yei River District, without date, *Cartwright* 2 (K); Equatorial Prov., Zande Land, 12 September 1940, *Wylde* 841 (BM). **Ethiopia**, 70 km SW of Jimma on Bonga Road, 25 January 1969, *Jones* 6913 (K); Kaffa Province, Ometch Village, 2 January 1962, *Meyer* 7887 (K); road from Soddo to Arba Mintch, 55 km from Soddo, 2 December 1967, *Westphal & Westphal-Stevels* 2927 (BR); **Democratic Republic of Congo**, Gimbi, July 1949, *Brynaert* 134 (BR); plaine du lac Edoard et de la rivière Rutshuru, 28 July 1937, *Louis* 4788 (BR-2 sheets); Ruzizi, 22 January 1950, *Germain* 5770 (G); Kivu Dist., Beni Prov., Kangali, 8 December 1954, *deWitte* 11387 (K). **Uganda**, elephant grassland, W. Kipayo, September–October 1914, *Dümmer* 1055 (BM); U4, 1 mile E. of Kakoge, Mengo, 14 December 1955, *Langdale-Brown* 1711 (K); U1, Mt. Debasien, 1936, *Eggeling* E2820 (K). **Kenya**, 70

miles from Isiolo, 23 May 1945, *Adamson* 79 (G); Kajiado Dist., Athi Plains 30 miles from Nairobi on the Namanga Road, 1 June 1963, *Verdcourt* 3647 (BR); K7, Lamu Dist., Kanwe-Mayi pool between Witu and Kipini, 4 March 1977, *Hooper & Townsend* 1182 (K); K1, Northern Frontier Prov., S. Turkana, c. 12 m NNE of Kangetet, 25 June 1970, *Matthew* 6383 (K); Kwale Dist., 38 km W. of Mombasa, 13 August 1975, *Wilson* 75141 (ASU, EA, NA). **Somalia**, *Webi Schabeli*, 1891, *Keller* 53 (K); Sheik husin, 25 September 1894, *Donaldson-Smith* 200 (BM). **Rwanda**, Territ. Buinda, Reg. du Mutaro, environ de Karukwangi, 15 April 1958, *Troupin* 7097 (BR); Rwabiega, Parc Nat. de la Kagera, January 1938, *Lebrun* 9806 (B). **Burundi**, Bujumbura, 12 May 1971, *Lewalle* 5719 (BR); route de Bugarama, km 10, territ. Bujumbura, 24 May 1966, *Lewalle* 844 (K). **Tanzania**, Bahi, on the Dodoma to Manyoni Rd, mile 38, 23 April 1962, *Polhill & Paulo* 2129 (BR); Shinyanga Reg., 5 km S. of Shinyanga on Hwy B-6, 28 July 1975, *Wilson & Kissie* 7579 (NA); Tabora Region, 12 km W. of Tabora on road to Urumbo, 29 July 1975, *Wilson & Kissie* 7580 (EA, NA); T7, Njombe Dist., 19 m E. of Rujewa on road from Mbeya to Iringa, 6 April 1969, *Jones* 69130 (K); T6, Masada, 28 June 1973, *Greenway & Kanuri* 15280 (K); Kondoia Dist., Mapapu, Mbuga, 15 May 1929, *Burt* 2067 (BM); Tanga Prov., Handeni Dist., Handeni Town, 5 August 1989, *Mhoro* 6301 (TEX); Cheju Plain, Zanzibar, 6 August 1933, *Vaughan* 2158 (BM). **Angola**, Huila, Cassinga, Chamutete, 2 April 1960, *Barbosa & Correia* 8965 (BM); Mossamedes Dist., 1 August 1859, *Welwitsch* 4931 (BM); Huila, Quipungo, Handa, 1 May 1967, *Henriques* 1079 (BM); Pungo Adongo, April 1857, *Welwitsch* 5274 (BM); Huila, Chicungo, 9 May 1962, *Texeira & Almeida* 5625 (BR). **Zambia**, Mkushi Dist., Tiwila Congo Zambesi Basin, 1932, *Hewitt* 37 (BM); Marumba (Livingstone), June 1909, *Rogers* 7142 (BOL). **Zimbabwe**, Umtali, 22 February 1960, *Head* 22 (BM); Nartley Dist., Poole Farm, 15 April 1950, *Nornby* 3171 (BM); Manica Dist., Umtali Div., Odranis River Valley, 1914, *Teague* 130 (BOL). **Malawi**, Mafina Hills, Chisenga, 24 August 1962, *Tyrer* 535 (BM); S. Region, Thyolo Dist., Boumbure, 7 May 1983, *la Croix* 2272 (BM). **Mozambique**, Lourenço Marques Dist., Sul do Save, Costa do Sul, 3 March 1949, *Barbosa* 2637 (BM); Sul do Save, Guijá, 4 May 1957, *de Carvalho* 151 (BM); Sul do Save, estrada Chissano-Chibuto, 8 July 1948, *Myre* 46 (BM); Cabo Delgado, Macondes, 10 April 1964, *Torre & Paiva* 11849 (K); Maputo, Marracuene, ao km 34 da Estrada Nacional no. 1, 25 May 1977, *Nuvunga, Munguze & Doane* 1 (NBG). **Namibia**, Grootfontein Dist., Farm Bergen, 25 April 1963, *Giess, Volk & Bleissner* 6453 (PRE); Tsumeb, 22 April 1934, *Dinter* 7549 (B-2 sheets). **Botswana**, floodplain grassland of the Sibuyu River, 12 April 1983, *Smith* 4250 (PRE); Savuti, Chobe Nat. Park, 25 March 1948, *Jacobsen* 3053 (PRE); Northern Dist., Thamelakane River, Maun, 24 March 1976, *Smith* 1666 (B). **South Africa**, Transvaal, Grobiersdal, Mossiesdal, 11 March 1958, *Meeuse* 10321 (PRE); Transvaal, Waterburg, 6 December 1931, *Galpin* 11569 (BOL); Transvaal, Shilouvane, 1904–1905, *Junod* 2265 (G); Natal, Uvongo Beach, April 1968, *Liebenberg* 8099 (PRE); Natal, sandy flat near Durban, 27 April 1893, *Wood* 4848 (BM); Natal, Port Shepstone, 3 April 1966, *Strez* 6540 (BR, G). **Swaziland**, Lubombo Dist., 7 km W. of Siteki, 31 March 1977, *Kemp* 825 (PRE). I also examined cultivated specimens from Afghanistan, Yemen, Eritrea, Saudi-Arabia, Mauritania, India, Vietnam, Pakistan, Egypt, Thailand, and Nepal.

A number of variants in the *Hibiscus cannabinus-asper* group occur in nature, some of them representing hybrids or introgressive types. Others possibly represent undescribed taxa, but material is insufficient to describe them adequately, as follows: a form with very long bristly bracteoles (longer than the calyx) and bristly calyces: **Ethiopia**, *Schimper* 1484 (BM, K); **Tanzania**(?), *Schweinfurth* 1626 (B, BM, BR, G), **Uganda**, *Wilson* s.n. (K); a form with dense, stiff bristles mainly on the calyx midrib and marginal ribs: **Zambia**, *Fanshawe* 8786 (BR).

The varieties of Howard and Howard represent horticultural cultivars rather than botanical varieties. The key characters used to differentiate their varieties are generally simply inherited and are found in various combinations in cultivars, land races, and in wild forms of *H. cannabinus*. Hauman (1963) recognized var. *simplex*, but it is merely an entire-leaved form of this polymorphic species (*deWitte* 10527, 10617 (BR!)).

24. **Hibiscus parvilobus** F.D. Wilson, *sp. nov.* Type: Kenya, Rift Valley Prov., Nakuru Dist., 35°39'E, 0°9'S, c. 9 km NE of Londiani, 2743 m, 8 February 1973, *Spjut & Ensor* 3184 (EA!-holotype; BR!, K!-isotypes; sheets are also lodged at ASU which were prepared from plants grown at Phoenix from seeds of the original collection).

Fig. 2A.

Hibiscus berberidifolius F.D. Wilson in *Brittonia* 35: 178 (1983), non A. Rich. (1847), pro parte quoad specim. *Spjut & Ensor* 3184.

Caules aculeati; folia 5-lobata, apicibus et sinibus obtusissimis; pedunculi fructificantes <1 cm longi; bracteolae involucellorum non bifurcatae, lineares, subulatae vel triangulares, apicibus auctis; calyces in costas pilis densis, glabrati inter costas, nectariis in quoque costa prominentibus.

Many-branched perennial *shrub*, 1–4 m tall; stems with antrorse aculei and with fine, simple hairs up to 1.5 mm long, aculei and hairs sparse below, more dense above, and with a line of crisped pubescence changing position at each node. *Stipules* 6 mm long, linear, with sparse, fine, simple hairs. *Leaves*: petioles 1.6–6.5 cm long, with dense, woolly pubescence adaxially, sparse simple hairs abaxially, the blades 3.4–5.5 × 1–9 cm, the blades of all leaves on vegetative branches moderately to deeply 5-lobed, not differing much in size from the base to the apex of the plant, abaxially and adaxially with simple antrorse hairs to 1 mm long on midrib and principal veins, less dense or lacking on smaller veins and absent from the lamina, the base cordate, the margin finely serrate, the apex and sinus obtuse; the blades of mid-plant leaves on flowering branches 3-lobed, otherwise similar to those on vegetative branches, blades of upper leaves on flowering branches obscurely 3-lobed to entire, the base truncate, the margin finely serrate, the apex acute; nectary present on all leaves, 2 mm long; vegetative branchlets in the leaf axils to 2.5 cm long, blades up to 3 × 3 cm, ovate, the base truncate to very slightly cordate, the margin finely serrate, the apex obtuse. *Flowers* borne singly in the leaf axils of flowering branches; peduncles 0.3–0.5 cm long, articulating at the base or joint not evident, with dense, simple bristly hairs 2–3 mm long, borne at right angles to the peduncle; involucellar bracteoles 6–8, 5–11 mm long × 1–3 mm wide at the base, linear to subulate or triangular, flattened, several nerved, below with pubescence like that of the peduncle, above almost glabrous, apex entire; calyx 1.2–1.4 cm × 0.6 cm wide at the base in flower, 1.5–1.8 cm × 0.7–0.8 cm wide at the base in fruit, the lobes slightly acuminate, with pubescence like that of the peduncle on the ribs below, sometimes sparsely aculeolate on the ribs above, almost glabrous between the ribs, the nectary prominent, enlarged, 2 mm long; corolla light yellow with a prominent deep red-purple centre, the petals 3.5 × 3.5 cm, obovate, finely and densely pubescent dorsally, glabrous or pubescent ventrally; staminal column on only flower seen 23 mm long, deep red-purple; filaments 1 mm long, anthers and pollen tan; style branches 8 mm long, deep red-purple; stigmas deep purple. *Capsule* 16–17 × 15–16 mm, ovoid, densely appressed-pubescent, the beak 3 mm long, glabrous; seeds 4 × 3 mm, subreniform to triangular, dark brown, with minute pectinate scales, funiculus very dark brown, with a fringe of colourless hairs on the large end.

Collected in a more or less dry, scrubby forest with *Tarchonanthus camporatus* L., *Trichocladus ellipticus* Eckl. & Zeyh., *Euclea divinorum* Hiern, *Rhus natalensis* Bernh. ex Krauss, *R. vulgaris* Meikle, *Maytenus heterophylla* (Eckl. & Zeyh.) N. Robson, and *Scutia myrtina* Kurz.

DISTRIBUTION. Known to me only from the type collection.

25. *Hibiscus asper* Hook. f., *Niger fl.*: 228 (1849). Type: Sierra Leone, *Miss Turner* s.n. (K-holotype).

Fig. 2C.

Hibiscus verrucosus var. *punctatus* A. Rich., *Tent. fl. abyss.* 1: 59 (1847). Type: Ethiopia, crescit in provincia Chiré, *Petit* s.n.

Hibiscus cordofanus Turcz. in *Bull. Soc. Nat. Mosc.* 31: 193 (1858). Type: Ethiopia, Cordofan, 1837–1838, *Kotschy* 65 (KW-holotype).

Hibiscus cannabinus Mast. in Oliver, *Fl. trop. Afr.* 1: 204 (1868), non L. (1759), pro parte quoad syn. *H. asper*.

Hibiscus cannabinus Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 115 (1900), non L. (1759), pro parte quoad syn. *H. asper*.

Hibiscus cannabinus var. *chevalieri* Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 5: 125 (1901). Type: Hochreutiner (1901) did not designate a holotype for *H. cannabinus* var. *chevalieri* but lists two syntype specimens (neither of which I have seen), as follows: Mali, Koulikoro, moyen Niger, 6–14 October 1899, *Chevalier* s.n.; Mali, Sindou, terres cultivées parmi les plantations de cotonniers, 10 May 1899, *Chevalier* 856. *Chevalier* (1920) cites these two and a later collection from Guinea, *Chevalier* 14909 (G!, P!) under *H. cannabinus* var. *chevalieri*. Hochreutiner annotated a sheet at G as a '2nd form of *Hibiscus cannabinus* var. *chevalieri*, leg. *Chevalier*, Sindou et Niger moyen ex Herb. *Chevalier*' which is referable to *Hibiscus scotellii* Baker f.

Hibiscus vanderystii de Wild. in *Bull. Jard. Bot. État.* 5: 35 (1915). Type: Angola, Kwango, July 1913, *Vanderyst* 1377 (BR!).

Hibiscus cannabinus var. *punctatus* (A. Rich.) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 20: 82 (1916).

Hibiscus malangensis Baker f. in *J. Bot.* 77: 22 (1939). Type: Angola, Malange, River Cuango, near Xa-Sengue, c. 1075 m, 5 April 1937, Exell & Mendonça 274 (BM!).

Hibiscus asper var. *punctatus* (A. Rich.) Berhaut, *Fl. Sénégal*: 160 (1954).

Herb to 2 m tall; stems with antrorse aculeoli (aculeoli sometimes 2-fid) and with fine, simple to stellate hairs, and sometimes with a line of pubescence changing at each node. *Stipules* 3–6 mm long, filiform, with short, fine pubescence. *Leaves*: petioles 0.3–18 cm long, with pubescence like that of the stems or sometimes less or more pubescent, the blades extremely variable in size and shape, the blades of lower leaves 4–18 × 1.5–14 cm, strap-like, lanceolate, ovate, oval, or shallowly to deeply palmately 3–5(–7)-lobed (some blades even 2- or 4-lobed), the lobes sometimes secondarily lobed, the blades of upper leaves 2–7 × 0.2–6.5 cm, bract-like, lanceolate, oblanceolate, ovate, or 3-lobed, the blades of all leaves with 2-fid to stellate hairs on ribs and veins, more sparse on the adaxial surface, the base cuneate, truncate, or cordate, the margin regularly or irregularly finely to coarsely serrate or repand, the apex acute, the nectary 0.5–2 mm long, slit-like. *Flowers* axillary, solitary, or often with more than one flower at the same node; peduncles 0.2–0.8 cm long, articulating at or near the base, with or without antrorse aculeoli and straight bristles and with finer, simple to stellate hairs; involucellar bracteoles 6–7, 9–18 mm long, subulate to narrowly lanceolate-acuminate, with or without antrorse aculeoli or short, coarse pigmented bristles on enlarged bases plus some finer simple to stellate hairs, the apex entire, pointed, the base free or scarcely united; calyx 0.8–2.6 cm long, the lobes lanceolate to broadly lanceolate, short- to long-acuminate, with antrorse aculei or pigmented short, coarse bristles on enlarged red bases on the ribs, otherwise almost glabrous or with some fine hairs, the nectary small but conspicuous; corolla light yellow with a red-purple centre, the petals 2.8–4.5 × 2–3 cm, obovate, glabrous to sparsely stellate-

pubescent dorsally, glabrous ventrally; staminal column 10–12 mm long, dark pink, the filaments 0.5–1 mm long, the anthers tan-orange or red-purple, the pollen yellow; style branches included in the staminal column; stigmas red-purple. *Capsule* 12–19 × 12–16 mm, sparsely and finely short appressed-pubescent, the beak 1–2 mm long, pubescent, inconspicuous; seeds 3–4 × 2–3 mm, subreniform, dark brown, with parallel striations and minute protuberances, the funiculus with simple, coarse flattened hairs. Chromosome number, $n = 18$.

Ruderal and wild, in abandoned farm fields, savannas, grassland, river alluvium, moist rock basins, and edges of gallery forest.

DISTRIBUTION. Fig. 4. Widely distributed in subsaharan Africa, from Senegal to Ethiopia, Angola, Zambia, Mozambique, and Madagascar (Sprague, 1913). **Senegal**, Parc Nat. de la Basse Casamance, 26 November 1984, *Bamps* 7773 (BR). **Guinea-Bissau**, Bafatá, entre Cambasse et Geba, 19 October 1952, *Esperito-Santo* 3102 (BR). **Guinea**, Kouria et environs, 20 October 1905, *Chevalier* 14909 (G, P). **Upper Volta**, Duarkoye Station, 30 October 1973, *Audru* 5443 (P). **Sierra Leone**, Waterloo, 1 December 1936, *Deighton* 3346 (K). **Ivory Coast**, Bouaké, 6 February 1981, *Ake Assi* 15791 (BR); réserve de LAMTO, 11 November 1986, *Gautier-Béguin* 438 (G). **Ghana**, Northern, Mole Nat. Park, 25 km N. of Damango, 27 November 1995, *Schmidt, Amponsah & Welsing* 1790 (TEX); Dukwesiein, N. of Agogo, Ashanti, 23 December 1913, *Clupp* 599 (K); Weijaa, near Accra, October 1961, *Irvine* 4807 (K). **Mali**, Domaine soudanien vallée Si Kasso-Koutiala, 1 January 1951, *Roberty* 13324 (G). **Niger**, Parc Nat. du W, du Niger, près de la Mékrou, 2 December 1986, *Robbrecht & Leman* 3460 (BR). **Nigeria**, Junjeru, 10 October 1905, *Dalziel* 128 (K); Sokoto, October 1910, *Dalziel* 426 (K-2 sheets); near Toupé on grassy plain along Comoé R., 28 November 1967, *Geerling & Bokdam* 1521 (K). **Chad**, Sarh Station, 7 November 1974, *Palayer* 420 (P). **Cameroon**, Waza, 21 November 1969, *Hepper* 3956 (B, K). **Central African Republic**, Bambari Reg., 6 km SE of Bambari on the Alindao Road, 29 November 1984, *Fay* 1947 (K). **Sudan**, Sugura, Gedaref Dist., 28 September 1951, *Babiku Beshir* 145 (K). **Ethiopia**, in montibus prope Dscheladscheranne, 3 November 1839, *Schimper* 717 (G). **Congo**, bords du Congo, 14 April 1966, *Farron* 5100 (P). **Democratic Republic of Congo**, Orientale, Parc Nat. de la Garamba, 5 March 1951, *De Saeger* 1038 (BR, K). **Uganda**, Namaraprur(?), June 1915, *Dümmer* 2565 (BM). **Tanzania**, Mbeya Dist., base of Punguluma Hills, Parinari woodland, 21 April 1990, *Lovett & Kayombo* 4562 (TEX); Iringa Region, Mufindi Dist., Ngwazi, 15 April 1989, *Kayombo* 441 (TEX); 50 km W. of Lindi, 24 April 1935, *Schlieben* 6486 (BM). **Angola**, Dist. Ambaca, inter Mandiocae plantations prope Ngombe, October 1856, *Welwitsch* 5267 (BM, LISU); Dist. Cuanza Norte, Cassualala, Cuanza, 10 July 1923, *Gossweiler* 8927 (BM). **Zambia**, Kapiri Mposhi, 13 July 1932, *Young* 38 (BM). **Malawi**, Central Prov., Dowa Dist., 31 July 1951, *Chase* 3911 (BM); without precise locality, 24 May 1937, *Lawrence* 411 (BR). **Mozambique**, Nemaogao, Dist. Mocuba, November 1947, *Faulkner* 159 (K); Montepuez, proximidades do aldeamento de Nairó, 11 August 1972, *Mafumo* 12 (NBG). **Madagascar**, Beravi Interior, Gebinge, July 1879, *Hildebrandt* 3086 (BM).

Berhaut (1954) lists four collections of his *H. asper* var. *punctatus* (none of which are involved in the typification of *H. asper*): Senegal, *Berhaut* 1800, 4175, 4453, 4551; I have seen *Berhaut* 4175 (P), which I regard as an *H. asper* × *cannabinus* hybrid, and *Berhaut* 4551 (P), which perhaps also is a hybrid derivative but closer to the true *H. asper*.

26. *Hibiscus acetosella* Welw. [ex Ficalho in *Bol. Soc. Geogr. Lisbon*, sér. 2: 608 (1881), nom. nud.] ex Hiern, *Cat. Afric. Pl.* 1: 73 (1896). Type: Angola, Cuanza Norte, Golungo Alto, December 1854, *Welwitsch* 5271 (BM!-holotype; LISU!-isotype). Exell & Mendonça (1937) listed the specimen at LISU as 'tipo' (presumably the holotype), but it is more appropriate to list the BM specimen as holotype because the best set of Welwitsch's specimens were retained at BM (Hiern, 1896).

Fig. 2B.

Hibiscus eetveldeanus de Wild. & T. Durand in *Bull. Soc. Bot. Belgique* 38(2): 24 (1899). Type: Democratic Republic of Congo (Zaire): Monbanga, Dewèvre s.n. (BR-holotype).

Hibiscus surattensis var. *furcatus* (Willd.) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 112 (1900), pro parte quoad syn. *H. eetveldeanus*.

Hibiscus cannabinus Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 114 (1900), non L. (1759), pro parte quoad syn. *H. acetosella*.

Hibiscus surattensis var. *eetveldeanus* (de Wild. & T. Durand) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 6: 49–51 (1902).

Illustration: Ochse, *Veg. Dutch E. Ind.*: 474, fig. 295 (1960).

Annual or perennial *subshrub* to 2 m tall; stems and leaves green or red; stems glabrous to sparsely pubescent, not aculeate. *Stipules* 12–15 mm long, linear to very narrowly lanceolate, with a few simple hairs on the margins. *Leaves*: petioles 3–11 cm long, glabrous or finely pubescent, the blades 2–10 × 2–10 cm, shallowly to moderately 3–5-lobed below, sometimes entire above, glabrous or sparsely pubescent, the base cuneate, truncate, or subcordate, the margin crenate, the apex obtuse, the nectary 2 mm long, slit-like. *Flowers* axillary, solitary; peduncles 0.4–1.0 cm long, articulating near the base, glabrous to hirsute; involucellar bracteoles 8–10, 7–12 mm long below the apex, linear, with simple hairs on margins, the apex bifurcate, the outer fork 3 mm long, lanceolate, ascending or recurved, the inner fork 3 mm long, linear, ascending; calyx 1.5–2.5 mm long, the lobes ovate to ovate-lanceolate, acute to acuminate, nearly glabrous or sometimes with long simple hairs on the ribs, particularly near the base, the nectary present; corolla dusky pink (red-foliaged plants) or lemon yellow (green-foliaged plants), with a red-purple centre, the petals 2–5.5 × 1.5–3.5 cm, obovate, glabrous; staminal column 10–20 mm long, the filaments 1–2 mm long, the anthers purple, the pollen orange or tan; style branches included in the staminal column or up to 5 mm long; stigmas pink to red-purple. *Capsule* 19–25 × 12–18 mm, ovoid, almost glabrous to appressed-pubescent, the beak 1–2 mm long, glabrous; seeds 3 × 2.5 mm, subreniform, dark brown, the surface finely faveolate and with pectinate scales, the funiculus small, dark brown, glabrous. Chromosome number, $n = 36$.

Cultivated, ruderal, and naturalized; abandoned plantations, marshy habitats, forest clearings.

DISTRIBUTION. Probably African in origin (an amphidiploid species, possibly from hybridization of *Hibiscus asper* with *H. surattensis*: Menzel, 1986: 451). Now widely distributed in tropical and subtropical areas of both hemispheres as a cultigen used for ornamental and food purposes. *Westphal & Westphal-Stevens* 8978 (PRE) noted that the leaves are used for making tea in Cameroon. **Ivory Coast**, Adiopodonné, December 1963, *Ake Assi* 7376 (G). **Cameroon**, Ipono, near Ntem River, 3 December 1975, *Westphal & Westphal-Stevens* 8978 (PRE). **Sudan**, Kagelu, 1938, *Myers* 11897 (K). **Congo**, Kinsuka, 6 April 1967, *Pauwels* 4987 (BR). **Democratic Republic of Congo**, Bambesa, 23 October 1961, *Gerard* 5041 (BR); Yangambi, 13 January 1953, *Germain* 1880 (G). **Uganda**, Entebbe Region, 13 May 1925, *Maitland* s.n. (K). **Tanzania**, Mwanza Region, Sengerema, 26 July 1975, *Wilson & Kissie* 7561 (NA); Tanga Region, Muheza, 5 August 1975, *Wilson & Kissie* 75129 (ASU, EA, NA). **Príncipe**, S. Antonio, 31 August 1956, *Khonua* 12187 (BM). **São Tomé**, S. Vicente, 7 January 1949, *Espírito Santo* 77 (BR). **Angola**, Cuanza Norte, Golungo Alto, without date, *Welwitsch* 5270 (BM, LISU). **Lunda**, Dala, 29 June 1937, *Exell & Mendonça* 1456 (BM); Bié, Chitembo, 2 November 1966, *Teixeira* 10911 (BR); Moxico, Vila Cuzo-Cuchipoque(?), without date, *Gossweiler* s.n. (BM). **Zambia**, Mivini Lunga, 11 June 1963, *Edwards* 739 (BR). **Zimbabwe**, Harare (Salisbury), 23 June 1953, *Bertram* 43476 (BM, SRGH). **Mozambique**, Niassa, Vila Cabral, 1 March 1964, *Torre & Paiva* 10932 (BOL). **Mauritius**, garden at Phoenix, 19 April 1963, *Vaughan* 10752 (BM).

27. *Hibiscus gillettii* de Wild. in *Ann. Mus. Congo, Sér. Bot.* 5(1): 166 (1904). Type: Democratic Republic of Congo (Zaire), Bas-Congo, Kimuenze, March 1901, *Gillet* 2057 (BR!-holotype).

Annual (or sometimes perennial?) *herb*, stems branching near the base, sparsely fine stellate-pubescent, with or without coarse stellate hairs on enlarged bases below, coarse stellate hairs becoming more dense above. *Stipules* 2–6 mm long, filiform to linear, with fine, short pubescence. *Leaves*: petioles 0.2–7 cm long, with pubescence like that of the stems, the blades 1–5 × 0.1–5 cm, the blades of lower leaves shallowly to deeply palmately 3–5-lobed, midlobe lanceolate, ovate, obovate, or rhombic, length-width ratio from 1:1 to 4:1, the blades of upper leaves from bract-like near the apex to deeply 3-lobed, all blades finely stellate-pubescent and sometimes with a few coarse stellate hairs on bases on the veins abaxially and adaxially, the base cuneate, truncate, or cordate, the margin serrate to repand, the apex acute or obtuse, the nectary 1–3 mm long, prominent, slit-like. *Flowers* clustered at the apex of flowering branches, the branches up to 54 cm long; peduncles 0.2–0.8 cm long, articulating at the base, densely and finely stellate-pubescent and with or without coarse stellate hairs; involucellar bracteoles 10–14, 5–8 mm long below the apex, filiform to linear, densely and finely stellate-pubescent throughout and long-bristly on the margins, the apex bifurcate, the outer fork 1.5–4 mm long, linear, reflexed, the inner fork 4–9 mm long, filiform, ascending, the base free; calyx 1.0–1.6 cm long, the lobes lanceolate, acute to long-acuminate, finely stellate-pubescent with coarse, 2-fid to stellate hairs on the ribs, the ribs conspicuous, the nectary absent; corolla yellow with a red or reddish brown centre, the petals up to 3.5 cm long; staminal column 12 mm long, filaments 0.5 mm long; style branches 2 mm long. *Capsule* up to 12 × 11 mm, ovoid, densely appressed-pubescent, the beak inconspicuous; seeds 3 × 2 mm, subreniform, brownish, with parallel striations and a few pectinate scales.

27a. *Hibiscus gillettii* subsp. *gillettii*

Fig. 3C.

Hibiscus gillettii de Wild. in *Ann. Mus. Congo, Sér. Bot.* 5(1): 166 (1904).

Hibiscus poggei Gürke ex Engl. in Engl., *Pflanzenw. Ost-Afrika* 3(2): 400 (1921). Type: Angola, 'Lunda-Kasai Bezirk', *Pogge* s.n. (B).

Stems finely stellate-pubescent and with sparsely and coarsely stellate hairs throughout; leaves at mid-plant usually 5-lobed, length-width ratio of midlobe *c.* 2:1 to 3:1; outer fork of involucellar bracteole 2–4 mm long, the inner fork 6–9 mm long; calyx lobes acute to slightly acuminate in fruit.

Ruderal and wild, abandoned cultivated fields, savannas, and gallery forests.

DISTRIBUTION. **Fig. 5.** Democratic Republic of Congo, Angola and Zambia. **Democratic Republic of Congo**, Kisai Occidentale, Dibaya, 26 March 1957, *Liben* 2725 (BR); Miao, 4 June 1913, *Sparano* 18 (BR); Difuma (Kinshe), 9 March 1934, *Rossignol* 99 (BR); Katanga, Kafubu, 28 March 1927, *Quarré* 186 (BR-2 sheets); Wombali, without date, *Vanderyst* 1297 (BM); Nioki, Dist. du Lac Leopold, *Goossens* 6070 (BR). **Angola**, Lunda, Xa-Sangue, 4 April 1937, *Exell & Mendonça* 251 (BM); Lunda, near Vila Henrique de Carvalho, 15 April 1937, *Exell & Mendonça* 618 (BM); Moxico, Teixeira de Sousa, 4 July 1940, *Gossweiler* 12510 (BM); Nordeste da Lunda, Luachimo, 8 November 1946, *Gossweiler* 13.82K (BM). **Zambia**, Kabompo Dist., 6 km W. of Kabompo, 24 March 1961, *Drummond & Rutherford-Smith* 7267 (K).

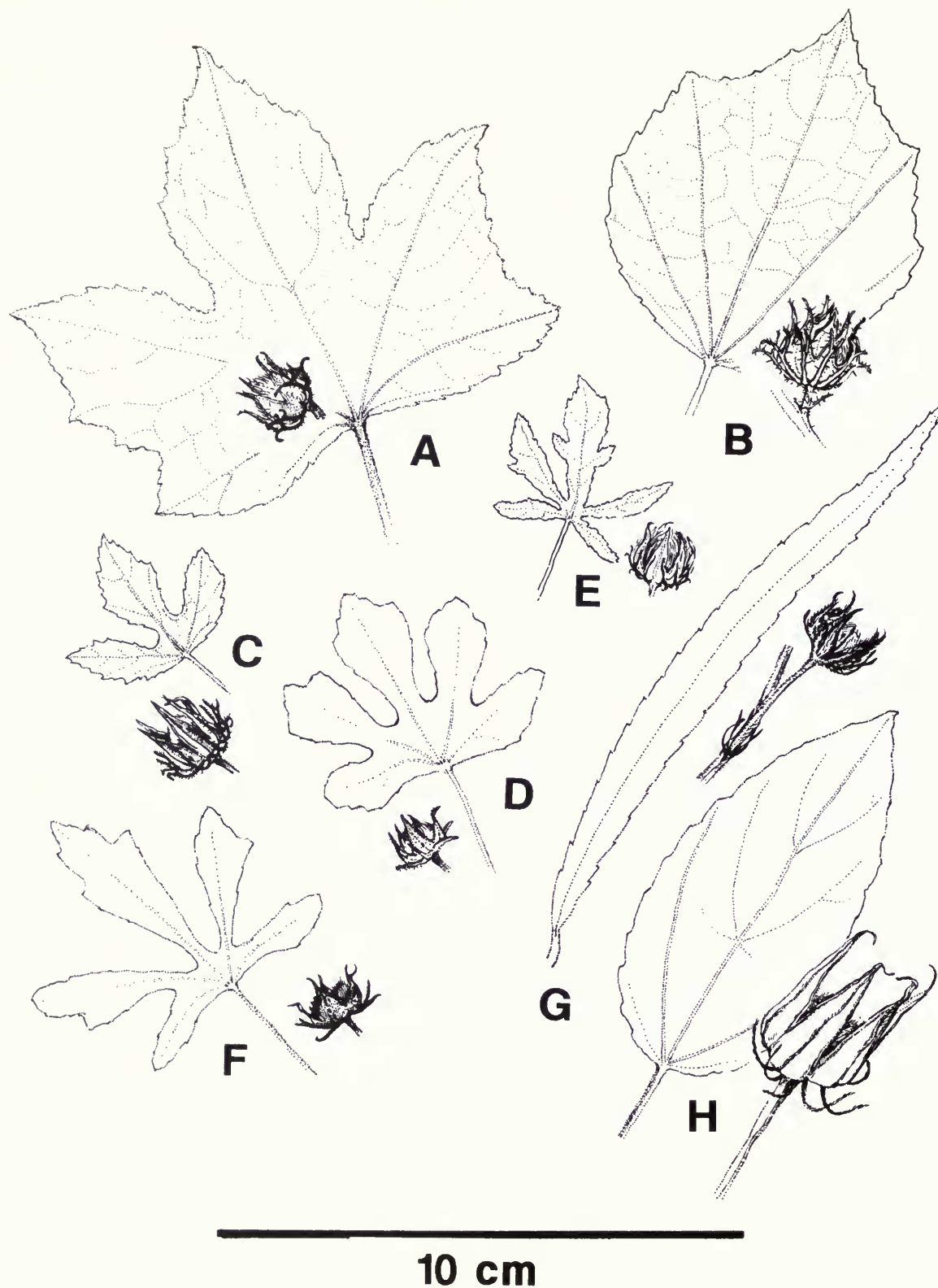


Fig. 3 Leaves and fruits of taxa of *Hibiscus* section *Furcaria* and *H. trichospermoides*. **A:** *H. cuanzensis*, Welwitsch 5241 (BM); **B:** *H. mastersianus*, leaf: Exell, Mendonça & Wild 1458 (BM), fruit: Beddome 581 (BM); **C:** *H. gillettii* subsp. *gillettii*, Quarré 186 (BR); **D:** *H. sineaculeatus*, leaf: Olorunfeni FHI 24354 (K), fruit: Keay FHI 22587 (K); **E:** *H. moxicoensis*, Exell & Mendonça 1599 (BM); **F:** *H. scotellii*, Glanville 111 (K); **G:** *H. elongatifolius*, Zenker 1440 (P); **H:** *H. trichospermoides*, Humbert & Capuron 19291 (G).

E. Morith at B wrote to E.G. Baker, 5 December 1938. Morith had compared *Exell & Mendonça* 618 with the type of *Hibiscus poggei* at B and said that they were the same species. *Exell & Mendonça* 618 (BM!) is *H. gillettii* subsp. *gillettii*.

27b. *Hibiscus gillettii* subsp. *hiernianus* (Exell & Mendonça) F.D. Wilson, **comb. et stat. nov.**

Hibiscus mastersianus Hiern, *Cat. Afric. Pl.* 1: 71 (1896), pro parte quoad specims. *Welwitsch* 4927 et 4928.

H. surattensis var. *mastersianus* (Hiern) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 112 (1900), pro parte quoad specims. *Welwitsch* 4927 et 4928.

Hibiscus hiernianus Exell & Mendonça in *J. Bot.* 74: 136–137 (1936). Type: Angola, Huila, January 1860, *Welwitsch* 4927 (BM!-holotype).

Stems finely stellate-pubescent and with occasional coarse stellate hairs below, increasing in density above; leaves at mid-plant mainly 3-lobed, the midlobe often conspicuously obovate or rhombic, the length-width ratio approaching 1:1; outer fork of involucellar bracteole 1.5–3 mm long, the inner fork 4–5 mm long; calyx lobes acute to slightly acuminate in fruit. Chromosome number, $n = 18$.
River banks, river marshes, grasslands, and woodlands.

DISTRIBUTION. **Fig. 5.** Angola and Zambia. **Angola**, River Tiengo Cuito, 5 March 1906, *Gossweiler* 3665 (BM) [See Exell & Mendonça, 1951]; Huambo, 22 February 1927, *Lynes* s.n. (BM); Huila, May 1860, *Welwitsch* 4928 (BM); S. Angola, without date, *Pearson* 2102 (BOL). **Zambia**, Kasama Dist., Chibutubutu, 24 February 1960, *Richards* 12562 (K); Mwinilunga, 16 June 1963, *Edwards* 796 (K).

27c. *Hibiscus gillettii* subsp. *lundaensis* (Baker f.) F.D. Wilson, **comb. et stat. nov.**

Hibiscus lundaensis Baker f. in *J. Bot.* 77: 21 (1939). Type: Angola, Lunda: Cacolo, River Cuilo, 11 April 1937, *Gossweiler* 11821 (BM!-holotype).

Stems finely and coarsely stellate-pubescent throughout; leaves at mid-plant deeply 5-lobed, length-width ratio of the midlobe *c.* 4:1; outer fork of involucellar bracteole *c.* 3 mm long, the inner fork 7–8 mm long; calyx lobes long-acuminate in fruit.

Annual herb among grasses.

DISTRIBUTION. **Fig. 5.** Angola. Known to me only from the type collection.

28. *Hibiscus moxicoensis* Baker f. in *J. Bot.* 77: 21 (1939). Type: Angola, Moxico: River Luena, near Vila Luzo, *c.* 1240 m, 4 May 1937, *Exell & Mendonça* 1599 (BM!-holotype).
Fig. 3E.

Perennial (annual?), prostrate *herb*; stems patchily lanate-pubescent below, continuous above; petioles, leaf blades, peduncles, involucellar bracteoles, and calyx also lanate or patchily lanate-pubescent (individual hairs stellate), interspersed with fine to coarse, simple to stellate hairs. *Stipules* 6 mm long, filiform, with short, fine hairs. *Leaves*: petioles 0.4–2.0 cm long, the blades 1–3.5 × 0.3–3.8 cm, deeply 3- to 5-lobed below to bract-like at the apex, the midlobe of lower leaves oblanceolate, the lateral lobes narrowly lanceolate, the outer lobes lanceolate, the midlobe and lateral lobes also secondarily lobed, the base cuneate, truncate, or subcordate, the margin regularly to irregularly serrate, the apex acute, the nectary 2 mm long, slit-like. *Flowers* sometimes axillary, solitary but mostly clustered at the apex of the main shoot or on flowering branches up to 8.5 cm long; peduncles 0.4 cm long in fruit, articulating at the base;

involucellar bracteoles 10–12, 4 mm long below the apex, filiform to linear, the apex bifurcate, the outer fork 3 mm long, linear, reflexed, the inner fork 4 mm long, linear, ascending, the base free; calyx 1.1–1.4 cm long in fruit, the lobes lanceolate, slightly acuminate, the ribs conspicuous, the nectary absent; corolla yellow with a red-brown centre. *Capsules* 11 × 10 mm, ovoid, densely appressed-pubescent, the beak 1.5 mm long, glabrous; seeds 2 × 2 mm, subreniform, very dark brown, with parallel striations, the funiculus inconspicuous, glabrous.

Habitat unknown.

DISTRIBUTION. **Fig. 5.** Angola. Known to me only from the type collection.

29. *Hibiscus cuanzensis* Exell & Mendonça in *J. Bot.* 77: 136 (1936). Type: Angola, Cuanza Norte, Pungo Adongo, April 1857, *Welwitsch* 5241 (BM!-holotype; G!, LISU!, P!-isotypes).
Fig. 3A.

Hibiscus furcatus Garcke in *Linnaea* 43: 121 (1881), non Roxb. (1814).

Hibiscus mastersianus Hiern, *Cat. Afr. Pl.* 1: 71 (1896), pro parte quoad specim. *Welwitsch* 5241.

Perennial *herb* to 1.5 m tall; the stems finely stellate-pubescent and with coarse stellate hairs, increasing in density towards the apex, not aculeate. *Stipules* 5–7 mm long, linear, densely and finely pubescent. *Leaves*: petioles 0.5–7 cm long, densely and finely stellate-pubescent, the blades 2–7.5 × 0.6–9 cm, the blades on lower leaves moderately 5-lobed, the midlobe and lateral lobes ovate, the outer lobes triangular, the blades of upper leaves lanceolate, ovate, or shallowly 3-lobed, the blades of all leaves densely stellate-pubescent and with a few short simple hairs abaxially, densely stellate-pubescent and with a few longer (to 2 mm) simple hairs adaxially, the base cuneate to truncate, the margin finely serrate to irregularly dentate, the apex acute, the nectary 2 mm long, slit-like, on upper leaves and on mid-plant leaves, apparently absent on lower leaves. *Flowers* axillary, solitary, or sometimes with more than one flower at a node or on a short flowering branch; peduncles 0.3–0.6 cm long, articulating at the base, densely and finely stellate-pubescent; involucellar bracteoles 9–10, 5–6 mm long below the apex, linear, finely pubescent and with longer bristles, the apex bifurcate, the outer fork 4 mm long, reflexed, the inner fork 5 mm long, ascending, the base free; calyx 1.4–1.6 cm long, the lobes triangular, acute to slightly acuminate, purple-punctate, densely and finely stellate-pubescent and with a few coarse 2-fid to stellate hairs on bases, the nectary absent; corolla yellow. *Capsules* 14 × 10 mm, ovoid, densely appressed-pubescent, the beak < 1 mm long, obscure; seeds unknown.

‘Ad dumetria junta lafera rivulorum’, etc. (*Welwitsch* 5241); ‘erva vivaz do mato xerófilo’ (Exell & Mendonça, 1937: 167).

DISTRIBUTION. **Fig. 5.** Angola. Narrow endemic, collected only from ‘Cuanza Norte, Pungo Adongo’. Exell & Mendonça (1937) cite, besides the type specimen, *Mechow* 103 (B), from the same general location.

Exell (1936) and Exell & Mendonça (1937) also cited *Welwitsch* 5242 under *Hibiscus cuanzensis*, but it is in fact *H. mastersianus* Hiern.

30. *Hibiscus mastersianus* Hiern, *Cat. Afric. Pl.* 1: 71 (1896) emend. excl. specim. angol. *Welwitsch* 4927, 4928, 5241. Type: Mozambique, Lupata, *Kirk* s.n. (K-lectotype, designated by Milne-Redhead, *Bull. Misc. Inform.* 1935: 273 (1935)).
Fig. 3B.

Hibiscus furcatus Mast. in Oliver, *Fl. Trop. Afr.* 1: 201 (1868), non Roxb. (1814), pro parte excl. specim. ex Gambia.

Hibiscus surattensis var. *mastersianus* (Hiern) Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 112 (1900), excl. specims. *Welwitsch* 4927, 4928.

Hibiscus pachmarhicus Haines in *Bull. Misc. Inform.* 1914: 24 (1914). Type: India, Central Provinces; common in the middle Gondwana sandstones about Pachmarhi in the Satpura range, 900 m, October 1911, *Haines* 197P (K-holotype).

?*Hibiscus beddomei* Rakshit & Kundu in *Sci. & Cult.* 27: 192 (1961). Type: India, South India, without precise locality, *Beddome* 91 & 92 (CAL-holotype).

Illustrations: Haines, *Bull. Misc. Inform.* 1914: 25, figs 1–7 (1914) (as *H. pachmarhicus*); Rakshit & Kundu, *Sci. & Cult.* 27: 192, fig. 1 (1961) (as *H. beddomei*).

Annual erect herb to 2 m tall; stems with sparse to dense, stiff simple to 3-fid or stellate pigmented bristles on enlarged bases and one or more lines of dense pubescence, not aculeate. *Stipules* 5–8 mm long, filiform. *Leaves*: petioles <1–18 cm long, hairy like the stems, the blades 2–16 × 0.3–15 cm, very shallowly palmately 3-lobed below to entire above, or bract-like near the apex, sparsely to densely stellate-pubescent on both surfaces, the base cuneate to truncate or cordate, the margin serrate to dentate, the apex acute to slightly acuminate, the nectary 1–3 mm long, slit-like, near base of midrib, and sometimes on the two adjacent ribs. *Flowers* axillary, solitary; peduncles 0.4–0.8 cm long, articulating at the base, hispid and with a few long bristles; involucellar bracteoles 9–10, 9–11 mm long, linear, ascending, hispid and with 1–2-fid bristles on the margins, the apex bifurcate, the outer fork 3–4 mm long, lanceolate, the inner fork 2–5 mm long, linear, the base free; calyx 1.1–2.0 cm long, the lobes lanceolate, slightly to long-acuminate, bristly mainly on the ribs, the nectary absent; corolla yellow with a purple centre, the petals 3–5 × 2–3 cm, obovate, sparsely stellate-pubescent dorsally, glabrous ventrally; staminal column 15 mm long, the filaments 1 mm long; style branches 1 mm long. *Capsules* 12–15 × 9–11 mm, ovoid-acuminate, densely appressed-pubescent, beak 2 mm long, glabrous; seeds 4 × 3 mm, angular to subreniform, faveolate, beset with numerous pectinate scales. Chromosome number, $n = 18$.

Ruderal and wild, in old cultivation, in open and mixed grassland, savannas, dense bush and woodland.

DISTRIBUTION. **Fig. 5.** Eastern, southern and southwestern Africa, Tanzania to South Africa; possibly adventive in India. An anonymous reviewer reported it as having been recorded from Mutomo Hill, Kitui Dist., Kenya, but I saw no specimens from Kenya. **Tanzania**, Kondo Dist., Sambala, 28 March 1929, *Burt* 2152 (BM); Iramga Plateau, April 1959, *Hammond* 263 (K); Nbulu Island, Lake Tanganyika, 1 April 1955, *Richards* 5389 (BR); Western Province, Tabora-Itigi, 27 April 1962, *Tallantire* T628 (K); Mpulungu...Pier L'île de Niamkolo, 27 March 1947, *Van Meel* 1352 (BR); Mwanza Region, 27 km E. of Geita on Hwy B-163, 26 July 1975, *Wilson & Kissie* 7559 (ASU, EA, NA). **Angola**, Pungo Adongo, 1 May 1857, *Welwitsch* 5242 (BM); Okavongo Native Territory, 25 February 1956, *deWinter & Marais* 4865 (BM). **Zambia**, Wankie Dist., Victoria Falls Village, 14 March 1974, *Gonde* 69/74 (K); Livingstone, 10 April 1930, *Jenkins* 44 (BM); 1 mile S. of Kafue on road to Livingstone, 2 April 1969, *Jones* 69126 (NA); Livingstone and common all along the line, April 1909, *Rogers* 7007 (BOL, K). **Mozambique**, Tete, Cabora Bassa, 19 April 1972, *Pereira & Correia* 2143 (BM). **Namibia**, Tsumeb, 20 March 1934, *Dinter* 7462 (BM); Grootfontein-Nord, zwischen Karakowisa und Numkaub im Omuramba, 5 March 1958, *Merxmüller & Giess* 1819 (BM); **Botswana**, Northern Div., Chobe-Zambesi confluence, 11 April 1955, *Exell, Mendonca & Wild* 1458 (BM); Savuti, Chobe Nat. Park, 25 March 1984, *Jacobsen* 3030 (PRE); Northern Div., 51 km S. of Shakawe on Sepopa Rd, 16 March 1965, *Wild & Drummond* 7102 (BR). **Zimbabwe**, Harley Dist., 13 January 1952, *Hornsby* 3256 (BM); Victoria Falls, 11 April 1925, *Pocock* 9 (BOL). **South Africa**, Transvaal, 14 January 1894, *Schlechter* 4160 (BOL). **India**, Madras, Jubbulpore, 1885, *Beddome* 581 (BM).

Hiern (1896) cited *Welwitsch* 4927, 4928, 5241, and 5242 from Angola as specimens of *Hibiscus mastersianus*. *Welwitsch* 4927 (BM!) and *Welwitsch* 4928 (BM!, LISU!) are referable to *H. gillettii* subsp. *hiernianus*; *Welwitsch* 5241 (BM!, G!, LISU!, P!) is referable to *H. cuanzensis*; *Welwitsch* 5242 (BM!, G!, LISU!) is typical *H. mastersianus*, not a form of *H. cuanzensis*, as *Exell & Mendonça* (1937) surmised. *Sacleux* 2141 (P-2 sheets, one collected July 1894, the other collected February 1898), from Kenya, is near *H. mastersianus*, but may be an undescribed species; it has very distinctive deeply 7-lobed leaves; the lobes are obovate and are themselves secondarily lobed.

31. ***Hibiscus elongatifolius*** Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 4: 117 (1900). Type: Cameroon, Sanaga, Urwaldgebiet, 1897, *Zenker* 1440 (P!-holotype; BM!, G! [2 sheets]-isotypes). Fig. 3G.

Habit unknown; stems pilose, with matted grey hairs. *Stipules* 8–11 mm long, filiform or linear, each stipule divided into 2 or 3 filiform or linear segments, finely appressed-pubescent. *Leaves*: petioles 0.3–0.8 cm long, with pubescence like that of the stem, the blades 2.5–12.5 × 0.3–0.8 cm, linear, abaxially densely grey stellate-pubescent, adaxially with less dense, simple to 3-fid grey hairs, the base cuneate, the margin serrate, the apex acute, the nectary absent. *Flowers* borne on a leafless shoot, at first clustered near the apex, later axillary, solitary, as the shoot elongates; peduncles 1.7–2.2 cm long, articulating at the base, with pubescence like that of the stem; involucellar bracteoles 11–13, 9–12 mm long, filiform-linear, ascending, with dense, soft, appressed pubescence, the apex entire, the base free; calyx 1.4–1.5 cm long, the lobes lanceolate, acuminate, densely and softly appressed-pilose, the nectary 1 mm long, slit-like; corolla orange-red(?), petals 2 cm long, glabrous(?), the petal spot not seen. *Capsules* 10 × 10 mm, oval, densely appressed-pubescent, the beak inconspicuous; seeds unknown.

DISTRIBUTION. **Fig. 5.** Cameroon. Known to me only from the type collection.

32. ***Hibiscus sineaculeatus*** F.D. Wilson, **sp. nov.** Type: Nigeria, Zaria Province, Kan Gimi Veg. mapping area, Dutsen Gwagwa, 20 October 1947, *Keay* FHI 20117 (K!-holotype). Fig. 3D.

Hibiscus scotellii Keay, *Fl. W. trop. Afr.* 2nd ed. 1(2): 347 (1958), non Baker f. (1894), pro parte quoad specims. *Keay* FHI 20017, *Lely* 609, P686.

Caulis non aculeati; folia ovata ad 3-lobata; pedunculi fructificantes ≤1 cm longi; bracteolae involucellorum 2 mm latae ad basim, non bifurcatae, subulatae, apicibus acutis; calyces pilis stellatis tenuis atque setis rigidis ad basim rubris, nectariis in quoquo costa.

Erect shrubby herb to 2 m tall; stems, petioles, leaf blades, peduncles, and involucellar bracteoles densely and finely stellate-pubescent and sometimes with some coarse stellate hairs, not aculeate. *Stipules* 2–4 mm long, filiform to linear, with short, fine hairs. *Leaves*: petioles 0.8–6 cm long, the blades 2–8 × 0.7–5 cm, on lower leaves ovate to palmately shallowly or deeply 3-lobed, on upper leaves bract-like to narrowly lanceolate, the base cuneate, truncate, or cordate, the margin serrate, dentate or repand, the apex acute to obtuse, the nectary 0.5–1.5 mm long, slit-like. *Flowers* axillary, solitary, or with an additional smaller flower on a short branch; peduncles 0.2–1.0 cm long, articulating at the base; involucellar bracteoles 6–7, 6–10 mm long, 2 mm wide at the base, subulate, several nerved, the apex entire, pointed, the base free; calyx 1.1–1.8 cm long, the lobes triangular to broadly lanceolate, short- to

long-acuminate, finely stellate-pubescent and with simple to stellate stiff bristles on enlarged red bases on the ribs, the nectary small but conspicuous; corolla pale yellow to yellow with a deep crimson to purple centre, the petals 3–4 × 1–2 cm, obovate, with sparse simple to stellate pubescence dorsally, glabrous(?) ventrally. *Capsules* 10–14 × 12–14 mm, with long, dense appressed pubescence, the beak 1–1.5 mm long, glabrous; seeds unknown.

Ruderal and wild, in farm fields, in rocks in grasslands and in open savanna woodlands.

DISTRIBUTION. **Fig. 5.** Nigeria. **Nigeria**, Panshanu, N. Nigeria, 20 September 1921, *Lely* 609 (K); N. Nigeria, without precise locality, September 1930, *Lely* P686 (K); Zari Prov., Zari Dist., Anara F. R., Kangimi, 23 September 1948, *Olorunfeni* FHI 24354 (K); Oyo Prov., Oyo Dist., about 3 miles to Oke-ihu on the Iseyin road, 17 October 1959, *Onochie* FHI 40873 (K); Ondo Prov., Idanre Hills, Carter Peak, 24 October 1948, *Keay* FHI 22587 (K).

33. *Hibiscus scotellii* Baker f. in *J. Linn. Soc., Bot.* **30**: 74–75 (1894). Type: Sierra Leone, on gneissose rocks by Scarcies River, 2 miles N. of Sasseni, January, *Scott-Elliott* 4535 (K-holotype; BM!-isotype).

Fig. 3F.

Hibiscus cannabinus var. *chevalieri* Hochr. (1901), pro parte quoad specim. *Chevalier* s.n. (G!).

Erect, little-branched *herb* to 2 m tall; stems, stipules, petioles, leaf blades, peduncles, bracteoles, and calyx densely covered with very fine stellate pubescence. *Stipules* 2–4 mm long, linear to subulate. *Leaves*: petioles 0.2–5 cm long, the blades 1–7 × 0.3–7 cm, the blades of lower leaves shallowly to deeply 3–5–(7)-lobed, the lobes usually oblanceolate to secondarily lobed, the blades of upper leaves strap-like or bract-like, the base cuneate, the margin distantly and finely serrate, the apex acute or obtuse, the nectary 0.5 mm long, usually on the midrib and two lateral ribs. *Flowers* axillary, solitary or sometimes clustered on short branches; peduncles 0.2–1 cm long, articulating at the base; involucellar bracteoles 6–7, 4–10 mm long, 1 mm wide at the base, linear, flattened, several-nerved, the apex entire, slightly broadened to lanceolate, the base free; calyx 0.7–1.4 cm long, the lobes triangular to broadly lanceolate and acuminate, the nectary present but sometimes inconspicuous; corolla yellow to primrose yellow, with a dark red to purple centre. *Capsules* 6–11 × 6–10 mm, ovoid, densely appressed-pubescent, the beak <1 mm long, inconspicuous; seeds 3 × 2 mm, subreniform, shiny, dark brown, sparsely covered with minute, 2-fid to stellate hairs, the funiculus small, with very fine hairs.

In open, sunny locations in grasslands and among rocks.

DISTRIBUTION. **Fig. 5.** Sierra Leone, Ivory Coast, and Mali. **Sierra Leone**, Tisana, Bonthe Island 14 November 1931, *Deighton* 2318 (K); Lungi, 28 November 1928, *Glanville* 111 (K-2 sheets); E. of York on road, 2 April 1958, *Melville & Hooker* 381 (K); Falaba Rest House, 26 November 1965, *Morton* SL 2852 (K); Sugarloaf, 1892, *Scott Elliott* 4031 (BM). **Mali**, Sindou et Niger moyen, *Chevalier* s.n. (G). **Ivory Coast**, near Brafoudi, 75 km NW of Abidjan, 30 December 1958, *Leeuwenberg* 2293 (B).

POORLY KNOWN AND EXCLUDED SPECIES

Hibiscus baumanii Ulbr. in *Notizbl. Bot. Gart. Mus. Berlin-Dahlem* **8**: 167 (1922). Type: Togo, tree prairies and savannahs N. to 7° N, *Baumann* 400 (B-holotype).

Ulbrich stated that this taxon is related to *Hibiscus elongatifolius* Hochr. and placed it in his series *Furcaria cannabina*. No specimen was found at B. Hutchinson & Dalziel (1928) treated *H. baumannii*

as a synonym of *H. congestiflorus* Hochr. (section *Ketmia*) [*Annuaire. Conserv. Jard. Bot. Genève* **10**: 21 (1906)] and cited *Baumann* 400 under this species.

Hibiscus beddomei Rakshit & Kundu in *Sci. & Cult.* **27**: 192 (1961). Type: India, South India without precise locality, *Beddome* 91 & 92 (CAL-holotype).

This plant is probably conspecific with *Hibiscus mastersianus* Hiern. Both have stiff stem pubescence, ovate, shallowly 3–5-lobed hairy leaves with cordate bases, 9–10 stiffly pubescent involucellar bracteoles, acuminate calyx lobes with pubescence on the ribs (otherwise almost glabrous), and beaked, densely pubescent capsules. The plant in the photograph accompanying the description of *H. beddomei* (Rakshit & Kundu, 1961), even though poorly presented, strongly resembles *H. mastersianus*. Unfortunately, I have been unable to examine any authentic specimens of *H. beddomei*.

Hibiscus campanulifolius Ulbr. in *Notizbl. Bot. Gart. Mus. Berlin-Dahlem* **8**: 166 (1922). Type: Namibia, Tsumeb, *Dinter* 1692 (B-holotype).

Ulbrich places this species in series *Furcaria cannabina* but pencilled notes on two sheets at BM of sketches of the type specimens of *Hibiscus campanulifolius* suggest that it is referable to *H. lunarifolius* Willd. or *H. dongolensis* Del., in section *Ketmia*.

Hibiscus comoensis A. Chev., *Expl. bot. Afrique occ. franc.* **1**: 65 (1920), nom. nud. Hutch. & Dalziel, *Fl. W. trop. Afr.* **1**: 265, in clavi, 267 (1928); Hutch. & Dalziel, *Kew Bull.* **1928**: 298 (1928) descr. Type: Ivory Coast, Middle Comoe: between Akabossué and Ebrinahoné, 19 December 1909, *Chevalier* 22613 (P!-holotype; BR!, P!-isotypes).

Hibiscus comoensis, a plant of southeastern Ivory Coast (*Chevalier* 22613) and southwestern Ghana [between Kwapon and River Tano, c. 90 km W. of Kumasi, 23 December 1963, *Oldeman* 807 (BR)] (Figs 5, 6), was associated with other species of *Hibiscus* section *Furcaria* by Hutchinson & Dalziel (1928) in their key because the involucellar bracteole has a foliaceous appendage. This species does not fit into any of the currently recognized sections of *Hibiscus* because of its umbellate inflorescence, much reduced calyx lobes (0.4–0.5 cm long) with poorly developed ribs, and alternating involucellar bracteoles that are linear below and ovate above and much longer than the calyx lobes (6–7 mm long below and 3–6 mm long and 2–4 mm wide in the ovate portion).

Hibiscus friesii Ulbr. in *Feddes Repert.* **13**: 521 (1915). Type: Zambia, Chiruktu bei Broken Hill, *Fries* 239 (UPS-holotype).

Ulbrich placed this species in section *Furcaria* in his series *Friesia*. I did not see a specimen from B. Baker (1937) moved series (subsection) *Friesia* to the genus *Kosteletskyia*. Exell (1961) placed *Hibiscus friesii* in synonymy with *Hibiscus panduriformis* Burm.f., but suggested the possibility that it is a separate taxon. At any rate, *H. friesii* does not belong in section *Furcaria*.

Hibiscus furcatus Bahadur, Dayal & Raturi in *J. Bombay Nat. Hist. Soc.* **70**: 495–496, pl. II (1970), non Roxb. (1814).

This plant, collected in northwestern India, is certainly not conspecific with *Hibiscus furcatus* Roxb. (*H. hispidissimus* Griff.). In fact, it may be a previously undescribed species of *Hibiscus* section *Furcaria*.

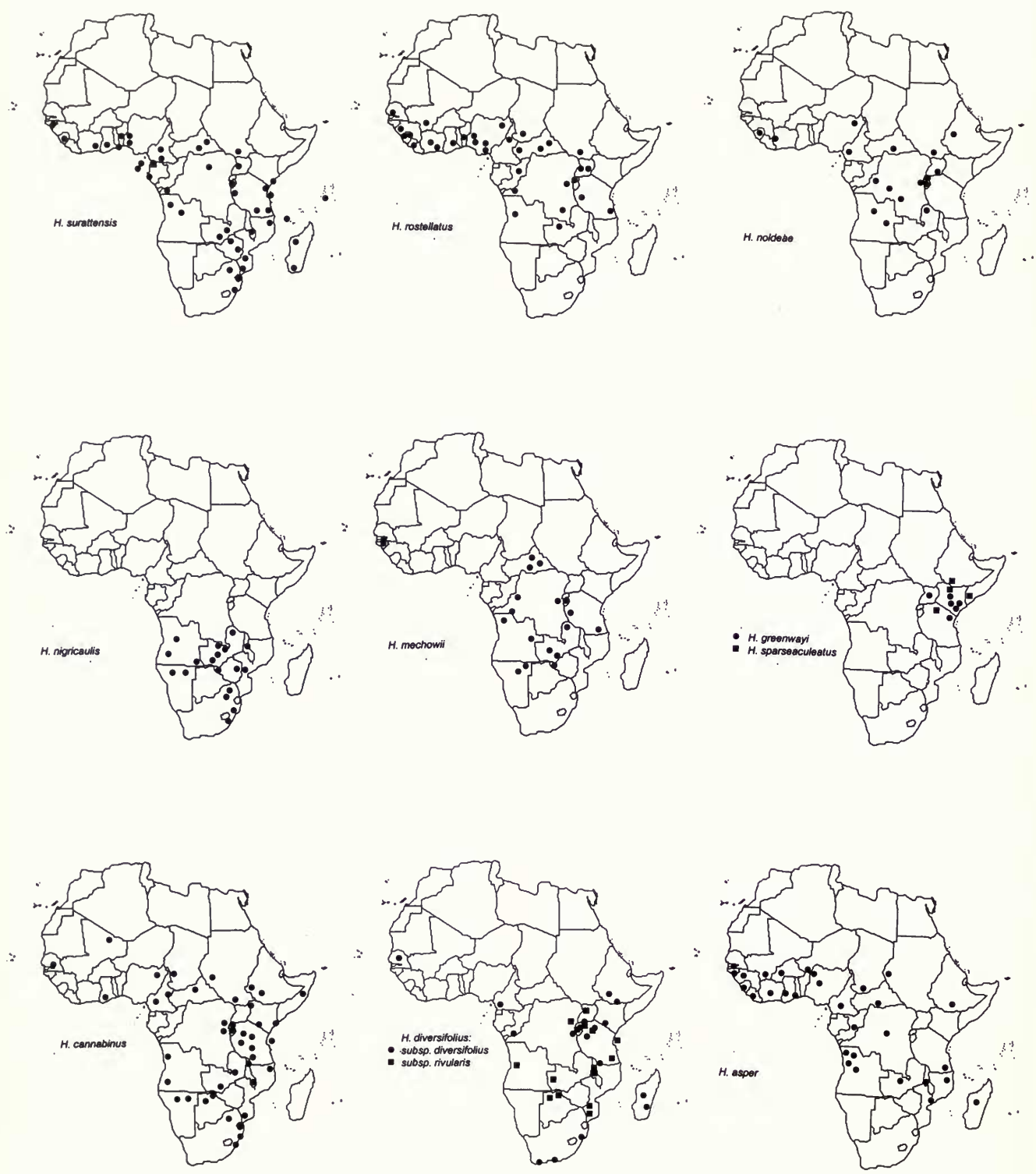


Fig. 4 African distributions of taxa of *Hibiscus* section *Furcaria*.

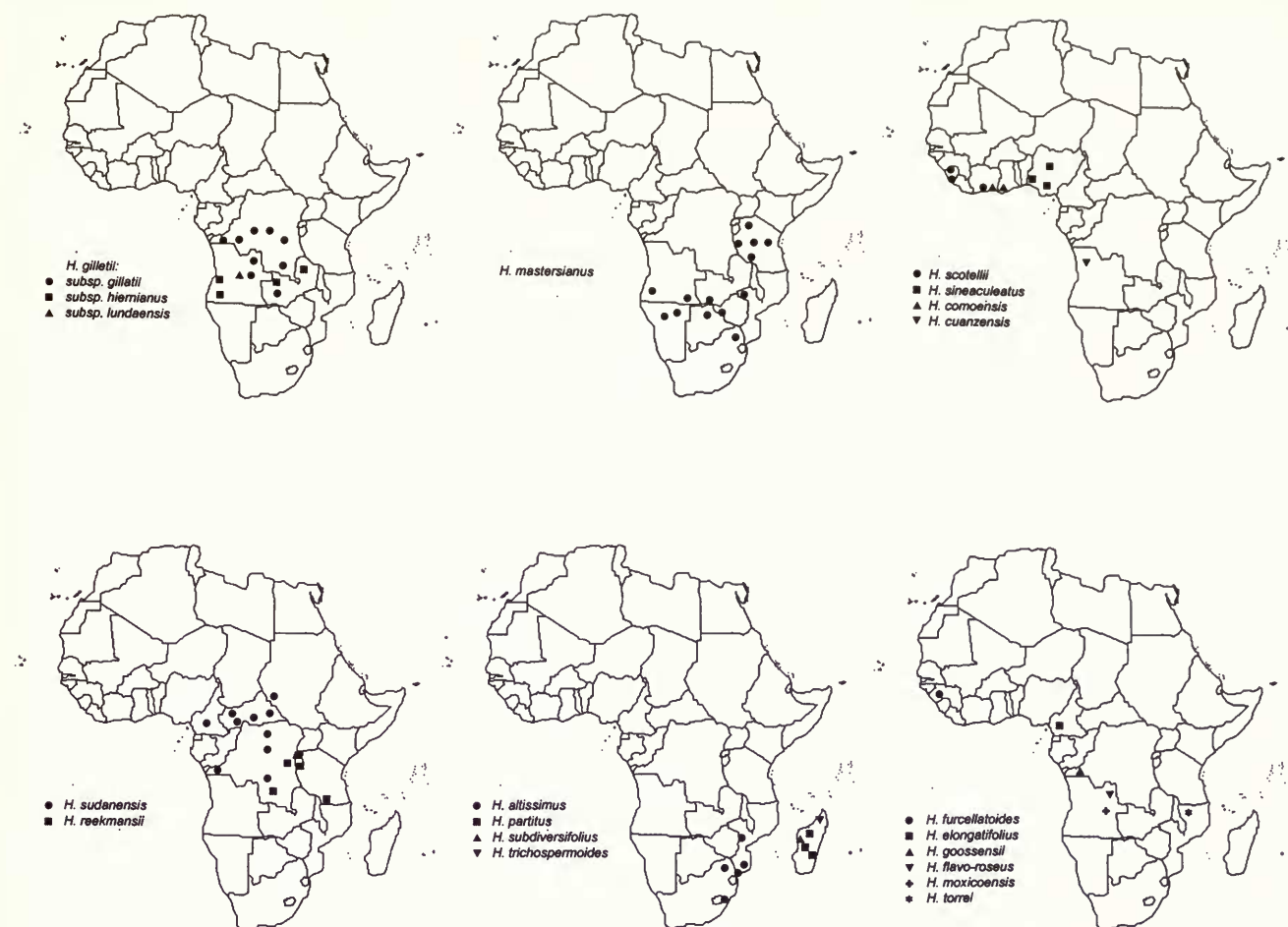


Fig. 5 African distributions of taxa of *Hibiscus* section *Furcaria*.

Bahadur *et al.* (1970) wrongly placed the following taxa in synonymy with the species that they called *H. furcatus* Roxb.: *H. aculeatus* Roxb., *H. furcellatoides* Hochr., *H. hispidissimus* Griff., and *H. rostellatus* Guill. & Perr.

Hibiscus furcatus* var. *microcarpus Mattei in *Boll. Reale Orto Bot. Giardini Colon. Palermo* 7: 103 (1908). Type: Somalia, Giumbo in reg. Goscia, *Macaluso* 55 (PAL-holotype).

Mattei differentiates this taxon from the Indian species *Hibiscus furcatus* [referring to *H. furcatus* Roxb., not to *H. furcatus* Willd.] by its short peduncles, small, deep yellow corolla, included capsule, and very short calyx. He also states that it has an affinity with *H. surattensis*. No specimen was found at PAL.

Hibiscus hispidissimus A. Chev., *Rev. Bot. Appliq.* 20: 326 (1940), non Griff. (1854), nom. illeg. (Art. 53.1) [based on *Hibiscus abelmoschus* var. *hispidissimus* A. Chev., *Explor. Bot. l'Afrique occ. franc.* 1: 63 (1920), nom. nud.] = *Abelmoschus esculentus* (L.) Moench (see Keay, 1958: 348). Type: Ivory Coast, Cercle du Baoule-Nord Vallée du Nzi moyen; entre Korakissikro et Manikro Casût, 1909, *Chevalier* 22307 (P!).

My opinion is that *Chevalier* 22307 is a typical specimen of *Abelmoschus esculentus*.

Hibiscus hoshiarpurensis T.K. Paul & M.P. Nayar in *Bull. Bot. Surv. India* 25: 188–189, figs 1–6 (1983). Type: India, Punjab, Dholbah, Hoshiarpur Dist., 22 September 1970, *Misra* 41888 (BSD-holotype).

This plant is closely related to *Hibiscus mastersianus* (including *H. beddomei*) but seems to be a genuine species, according to the description and accompanying illustration. It has lanceolate, unlobed leaves, and shorter petioles and longer calyx lobes in relation to the capsule than does *H. mastersianus*. It occurs in extreme northwestern India (Punjab), whereas *H. mastersianus* has a more southerly distribution in India.

Hibiscus imerinensis Ulbr. in *Notizbl. Bot. Gart. Mus. Berlin-Dahlem* 8: 168 (1922). Type: Madagascar, Imerina, near Tananarive, *Hildebrandt* 4033 (BM!, G!-isotypes).

Hochreutiner [*Fl. Madagasc.*, *Malvac.*: 46 (1955)] lists *Hibiscus imerinensis* as a synonym of *H. stenophyllus* var. *solandroketmia* (Hochr.) Hochr. [section *Solandra*]. At any rate, it does not belong in section *Furcaria*.

Hibiscus keilii Ulbr. in *Notizbl. Bot. Gart. Mus. Berlin-Dahlem* 8: 681 (1924). Type: Tanzania (Ostafrika), Usumbura, Luwironsa-Ufer bei Mugeru, 4 August 1905, *Keil* 183 (B-holotype).

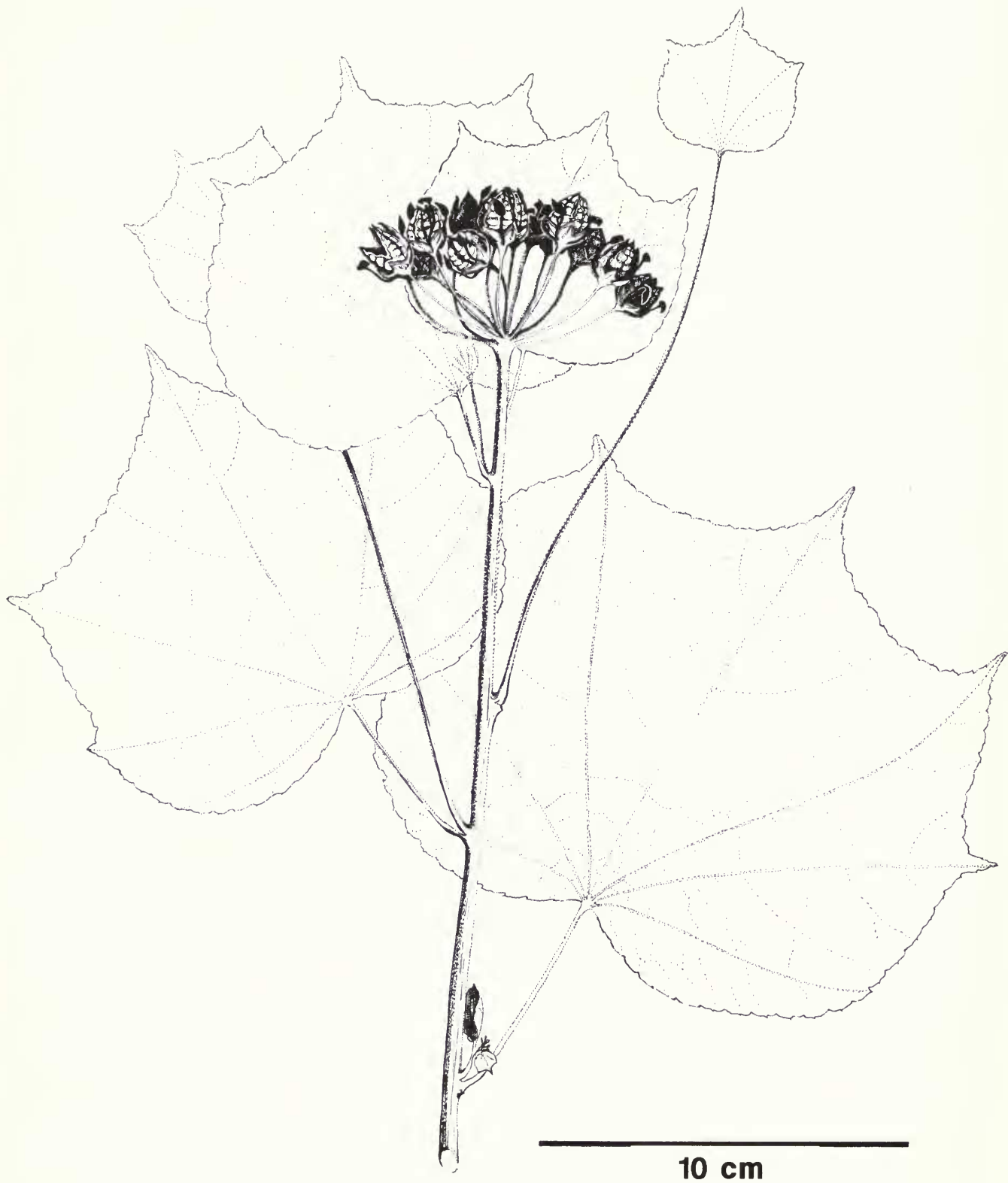


Fig. 6 *Hibiscus comoensis*, Oldeman 807 (BR).

Ulbrich placed this species in series *Furcaria furcellata* and noted that it is closely related to *Hibiscus rostellatus*.

Hibiscus paolii Mattei in Chiovenda, *Result. Sci. Somalia ital.* 1: 32 (1916). Type: Somalia, Bur-Meldac, Paoli 699 (PAL-holotype).

A sheet at BM (012890) has a poor sketch of this species. An abbreviated description on this sheet shows that this species belongs to section *Furcaria* and suggests a close affinity with *Hibiscus rostellatus* (rhomboid leaves and bifurcate involucellar bracteoles).

Hibiscus persicifolius Eckl. & Zeyher, *Enum. pl. afric. austral.*: 38 (1835); Harvey & Sonder, *Fl. Cap.* 1: 171–172 (1860). Type: South Africa, in the Great Karroo, between Graaf Reynet and Uitenhage, Ecklon & Zeyher 305 (Herb. Sond.).

I made inquiries at six herbaria (BM, K, MEL, NBG, S, and TCD) known to have Sonder specimens. A fragmentary sterile specimen of Ecklon & Zeyher 305 was found at NBG (photocopy seen), and two fragmentary specimens, one sterile and one flowering, were found at S (not seen). I designate the flowering specimen of Ecklon & Zeyher 305 at S as lectotype and the other specimens of this same collection as islectotypes. In addition, a fragmentary sterile specimen of apparently the same species (Ecklon & Zeyher s.n.) was found at MEL (photocopy seen). No specimens were found at the other three herbaria. The appearance of the plant fragments and the sketchy description of *Hibiscus persicifolius* suggests strongly that this is the Australian species, *H. heterophyllus* Vent. (In particular, the peduncles and calyx clothed with golden-yellow echinate tubercles). If so, the specimen must have been collected from a cultivated plant or one that had escaped cultivation. Ecklon & Zeyher's description of the flower as purplish is a little disturbing because *H. heterophyllus* has white or yellow flowers. However, the corollas of the white-flowered form are pink-tinged, particularly on the dorsal surface, and dry to a dark pink color.

Hibiscus procerus Roxb. ex Wall., *Cat. no.* 2692.

Roxburgh's illustration [Icones Roxburghianae 1506 (K!)] is of the white-flowered form of *Hibiscus heterophyllus* from Australia. Masters in Hooker, *Fl. Brit. India* 1: 339 (1872) gives as type: Burma, Wallich. If this plant was collected in Burma, it was obviously cultivated, not native there.

Hibiscus saxicola Ulbr. in *Notizbl. Bot. Gart. Mus. Berlin-Dahlem* 7: 179–180 (1917). Type: Cameroon, Ebolowa region, Mildbraed 5515 (B-holotype).

In his original description, Ulbrich placed this species in section *Azanza*, but later erected series *Saxicolae* under section *Furcaria* to accommodate it.

Hibiscus trichospermoides Hochr. in *Annuaire Conserv. Jard. Bot. Genève* 20: 82 (1916). Type: Madagascar, Grés liasiques, bois secs, Mt Ampohipirika (Herbier Perrier de la Bathie n. 62) (G!-holotype).

Fig. 3H.

Hibiscus bernieri var. *trichospermoides* (Hochr.) Hochr., *Fl. Madagas., Malvac.*: 65, fig. 17 (1955).

Illustration: Hochreutiner, *Fl. Madagasc., Malvac.*: fig. XII, 3–6 (1955).

The sectional placement of *Hibiscus trichospermoides* is in doubt. My opinion is that it does not belong in section *Furcaria*. The calyx

nervation resembles more closely other species of section *Solandra* rather than section *Furcaria*, but the capsule and seed characteristics are not like other species of either of these sections. No other African or Asian species of section *Furcaria* shows the same combination of diagnostic characters: stem not acuminate, peduncles long, articulating above the base, involucellar bracteoles not bifurcate, calyx nectary absent. Furthermore, the capsule has a dense stellate, unappressed tomentum, and the seed surface is covered with silky hairs to 3 mm long, characters that appear in no other species of *Furcaria* with which I am familiar. Hochreutiner, in his description of *H. trichospermoides*, thought that its closest affinity was with *H. heterophyllus* and related Australian species of section *Furcaria*, but later regarded it merely as a variety of *H. bernieri* Baill., which he inexplicably placed in section *Lilibiscus*.

I have seen no authentic specimens of *Hibiscus bernieri* var. *bernieri* but Hochreutiner's illustration and description suggest that these two entities, both endemic in Madagascar, are indeed closely related.

Figure 3H is Basse Mahahavy du Nord, au Sud d'Ambilobé, April 1951, Humbert & Capuron 19291 (G).

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REFERENCES

- Abdallah, M.S., Sa'ad, F.M. & El-Kholy, S.A. 1976. Taxonomical studies in the flora of Egypt VI. Culinary cultivars of *Hibiscus sabdariffa* L. in Egypt. *Notes Agricultural Research Centre Herbarium Egypt* 3: 1–20.
- Bahadur, K.N., Dayal, R. & Raturi, D.P. 1970. New plant records for the upper Gangetic Plain. *Journal of the Bombay Natural History Society* 70: 495–496, pl. II.
- Baker, E.G. 1937. Notes on tropical African species of *Hibiscus*. *Journal of Botany* 75: 98–102.
- Berhaut, J. 1954. *Flore du Sénégal, Clé Pratique*. Dakar.
- Borssum Waalkes, J. van 1966. Malesian Malvaceae revised. *Blumea* 14: 1–213.
- Cheek, M. 1992. *Hibiscus sparseaculeatus*. *Flowering Plants of Africa* 52(1): pl. 2058.
- Chevalier, A. 1920. Malvaceae. *Exploration Botanique de L'Afrique Occidentale Française* 1: 56–75. Paris.
- Crane, J.C. 1949. Roselle—a potentially important plant fiber. *Economic Botany* 3: 89–103.
- Dalziel, J.M. 1948. *The useful plants of West Tropical Africa*. London.
- Dempsey, J.M. 1975. *Fiber crops*. Gainesville.
- Duke, J.A. & duCellier, J.L. 1993. *CRC Handbook of alternative cash crops*. Boca Raton.
- Exell, A.W. 1936. Notes on the flora of Angola-III. *Journal of Botany* 74: 132–140.
- 1961. *Hibiscus*. In A.W. Exell & H. Wild (Eds), *Flora Zambesiaca* 1(2): 434–472. London.
- & Mendonça, F.A. 1937. *Hibiscus*. In L.W. Carrisso (Ed.), *Conspectus Florae Angolensis* 1(1): 158–176. Lisbon.
- 1951. *Hibiscus*. In L.W. Carrisso (Ed.), *Conspectus Florae Angolensis* 1(2): 177–180, 374–376. Lisbon.
- Fryxell, P.A. 1988. *Hibiscus*. In *Systematic Botany Monographs* 25: 192–232. Ann Arbor.
- 1992. Malvaceae. In G. Harling & L. Anderson (Eds), *Flora of Ecuador*. Copenhagen.
- Goforth, C.E. & Fuller, M.J. 1994. A summary of kenaf production and product development research 1989–1993. *Mississippi Agriculture and Forestry Experimental Station Bulletin* 1011. Mississippi State.
- Hauman, L. 1963. *Hibiscus*. In W. Robyns (Ed.), *Flore du Congo et du Ruanda-Urundi* 10: 94–136. Brussels.

Hiern, W.P. 1896. *Catalogue of the African plants collected by Dr. Friederich Welwitsch in 1853–61. Dicotyledons*. London.

Hochreutiner, B.P.G. 1900. Revision du genre *Hibiscus*. *Annuaire Conservatoire & du Jardin Botanique Genève* **4**: 23–191.

——— 1901. Malvaceae Chevalieranae. *Annuaire Conservatoire & du Jardin Botanique Genève* **5**: 120–126.

——— 1955. *Hibiscus*. In H. Humbert (Ed.), *Flore de Madagascar et des Comores, Malvaceae*: 8–83. Paris.

Holmgren, P.K., Holmgren, N.H. & Barnett, L.C. 1990. *Index herbariorum Part I: The herbaria of the world*, 8th ed. Bronx.

Howard, A. & Howard, G. 1911. Studies in Indian fibre plants 2. On some new varieties of *Hibiscus cannabinus* L. and *Hibiscus sabdariffa* L. *Memoirs of the Department of Agriculture in India, Botanical Series* **4**: 1–36.

Hutchinson, J. & Dalziel, J.M. 1928. *Flora of West Tropical Africa* 1st ed. **1**(2). London.

Kachecheba, J.L. 1972. The cytotaxonomy of some species of *Hibiscus*. *Kew Bulletin* **27**: 425–433.

Keay, R.W.J. 1958. *Flora of West Tropical Africa* **1**(2), 2nd ed. London.

Masters, M.T. 1868. *Hibiscus*. In D. Oliver (Ed.), *Flora of Tropical Africa* **1**: 194–208. London.

——— 1872. *Hibiscus*. In J.D. Hooker (Ed.), *The flora of British India* **1**(1): 334–344. London.

Menzel, M.Y. 1986. Genetic relationships among the relatives of *Hibiscus cannabinus* and *H. sabdariffa*. In K.A. Siddiqui & A.M. Faruqi (Eds), *New genetical approaches to crop improvement*: 445–456. Karachi.

——— & **Wilson, F.D.** 1969. Genetic relationships in *Hibiscus* sect. *Furcaria*. *Brittonia* **21**: 91–125.

Ochse, J.J. 1960. *Vegetables of the Dutch East Indies*. Buitenzorg.

Paul, T.K. & Nayar, M.P. 1980. The status of *Hibiscus furcatus* Roxburgh. *Bulletin of the Botanical Survey of India* **22**: 194–195.

——— 1988. *Hibiscus*. In M.P. Nayar, K. Thothathri & M. Sanjappa (Eds), *Fascicles of Flora of India*: 119–159. Calcutta.

Perry, R.C., Jones, D.E. & Bhangoo, M.S. 1993. A preliminary study on kenaf as a feed for livestock. In M.S. Bhangoo (Ed.), *Proceedings 1993 International Kenaf Conference*: 45–48. Fresno.

Pradeep, A.K. & Sivarajan, V.V. 1991. *Hibiscus hispidissimus*, the correct name for *H. furcatus* Roxb. ex DC. non Willd. and *H. aculeatus* Roxb. non Walter (Malvaceae). *Taxon* **40**: 634–637.

Rakshit, S.C. & Kundu, B.C. 1961. New species and varieties of *Hibiscus*. *Science & Culture* **27**: 192–194.

——— 1970. Revision of the Indian species of *Hibiscus*. *Bulletin of the Botanical Survey of India* **12**: 151–175.

Saldanha, C.J. 1985. *Hibiscus*. In *Flora of Karnataka* **1**: 248–253. Rotterdam.

Sprague, T.A. 1913. *Hibiscus asper*. *Kew Bulletin of Miscellaneous Information* **1913**: 418–419.

Taylor, C.S. 1992. Kenaf: annual fiber crop products generate a growing response from industry. In *U.S. Department of Agriculture Yearbook, New Crops, New Uses, New Markets*: 92–98. Washington, D.C.

Werber, F.X. 1993. Kenaf product and process research in ARS. In M.S. Bhangoo (Ed.), *Proceedings 1993 International Kenaf Conference*: 45–48. Fresno.

Wester, P.J. 1914. New varieties of roselle. *Philippine Agricultural Review* **7**: 266–269.

Wilson, F.D. 1978. Wild kenaf, *Hibiscus cannabinus* L. (Malvaceae) and related species in Kenya and Tanzania. *Economic Botany* **32**: 199–204.

——— 1983. The taxonomic status of *Hibiscus* (sect. *Furcaria*) *berberidifolius* A. Rich. *Brittonia* **35**: 175–179.

——— 1994. The genome biogeography of *Hibiscus* L. section *Furcaria* DC. *Genetic Research & Crop Evolution* **41**: 13–25.

——— & **Menzel, M.Y.** 1964. Kenaf (*Hibiscus cannabinus* L.) and roselle (*H. sabdariffa* L.). *Economic Botany* **18**: 80–91.

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